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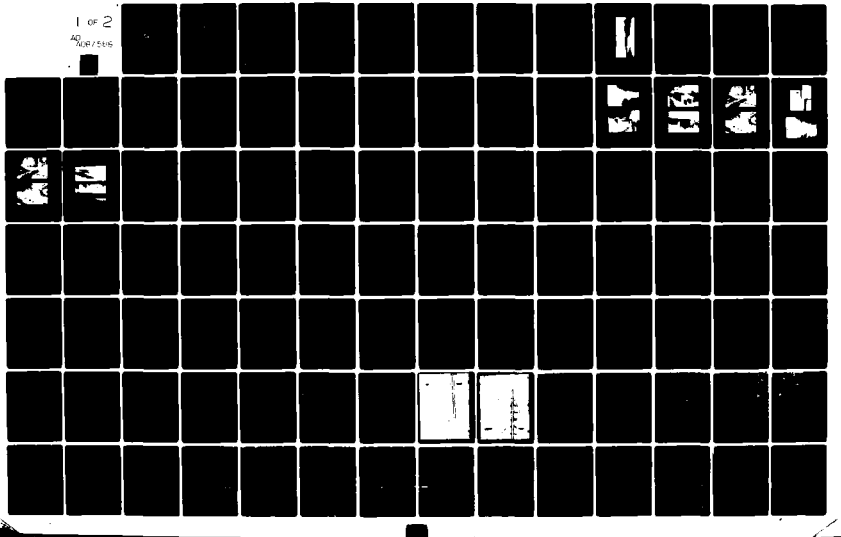


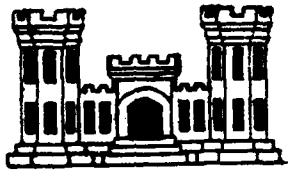
DELAWARE RIVER BASIN

ROXBURY DAM

DELAWARE COUNTY, NEW YORK

INVENTORY NO. N.Y. 788

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT CORPS OF ENGINEERS

FEBRUARY, 1980

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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER	2. GOVT ACCESSION NO. ADA087588
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) Phase 1 Inspection Report Roxbury Dam Delaware River Basin, Delaware County, NY Inventory No. NY 788	5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) George Koch, P.E.	8. CONTRACT OR GRANT NUMBER(s) DACW-51-79-C-0001
9. PERFORMING ORGANIZATION NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, NY 12233	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233	12. REPORT DATE 21 May 1980 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) Department of the Army 26 Federal Plaza/ New York District, CofE New York, New York 10007	15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

LEVEL II

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18. SUPPLEMENTARY NOTES

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Roxbury Dam
Deleware County
Boxbury

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which need to be evaluated and remedied.

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Using the Corps of Engineers' Screening Criteria for initial review of spillway adequacy, it has been determined that the dam would be overtopped by all storms exceeding 36% of the Probable Maximum Flood (PMF) inflows. However, a flood wave analysis indicates that the water surface levels downstream of the dam would be approximately the same under a given storm regardless of whether or not the dam breaches. Since the spillway does not have sufficient capacity to pass the outflows from one half the PMF and breaching of the dam does not substantially increase the hazard to downstream residents from conditions which would occur just prior to dam breaching, the spillway is adjudged as inadequate.

The structural stability analysis performed for this dam indicates that for severe conditions (ice loading, water surface at top of dam) that the stability of the service spillway weir is questionable. Further investigation of the stability of this section is required.

There is a wet area at the toe in an oversteepened portion of the downstream slope. This wet area might be caused by leakage through the reservoir drain pipe, whose outlet is buried in the slope. Further investigation is required to determine the cause of this wet area and to design appropriate remedial treatment.

A number of other deficiencies were also noted on this structure. Among the repairs required brush and trees growing on the dam must be cut, the reservoir drain should be uncovered and made operable, deteriorated and cracked concrete on the service spillway should be repaired, and the wood framework across the entrance to the auxiliary spillway channel should be removed.

It is recommended that within 3 months of the date of the notification of the owner, additional investigations of the structural stability and of the wet area at the downstream toe should be commenced. Remedial actions deemed necessary based on the results of these investigations should be completed within 12 months of the notification. An emergency action plan for notification of downstream residents should be developed within 6 months. The other deficiencies noted above should be corrected within 12 months.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

(11) 21 May 84 (10) George Koch

(15) DACW51-79-C-0001

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(6) ~~PHASE I INSPECTION REPORT~~
NATIONAL DAM SAFETY PROGRAM.
ROXBURY DAM (Inventory Number 788)
~~FILE No. NY 788~~
DELAWARE RIVER BASIN
DELAWARE COUNTY, NEW YORK.
Phase I Inspection Report

TABLE OF CONTENTS

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Roxbury Dam (I.D. No. NY 788)
State Located:	New York
County:	Delaware
Stream:	Unnamed Tributary of Delaware River
Date of Inspection:	November 1, 1979

ASSESSMENT

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which need to be evaluated and remedied.

Using the Corps of Engineers' Screening Criteria for initial review of spillway adequacy, it has been determined that the dam would be overtopped by all storms exceeding 36% of the Probable Maximum Flood (PMF) inflows. However, a flood wave analysis indicates that the water surface levels downstream of the dam would be approximately the same under a given storm regardless of whether or not the dam breaches. Since the spillway does not have sufficient capacity to pass the outflows from one half the PMF and breaching of the dam does not substantially increase the hazard to downstream residents from conditions which would occur just prior to dam breaching, the spillway is adjudged as inadequate.

The structural stability analysis performed for this dam indicates that for severe conditions (ice loading, water surface at top of dam) that the stability of the service spillway weir is questionable. Further investigation of the stability of this section is required.

There is a wet area at the toe in an oversteepened portion of the downstream slope. This wet area might be caused by leakage through the reservoir drain pipe, whose outlet is buried in the slope. Further investigation is required to determine the cause of this wet area and to design appropriate remedial treatment.

A number of other deficiencies were also noted on this structure. Among the repairs required brush and trees growing on the dam must be cut, the reservoir drain should be uncovered and made operable, deteriorated and cracked concrete on the service spillway should be repaired, and the wood framework across the entrance to the auxiliary spillway channel should be removed.

OVERVIEW
Roxbury Dam
I.D. No. NY 788

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
ROXBURY DAM
I.D. No. NY-788
#160D-646
DELAWARE RIVER BASIN
DELAWARE COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam

The Roxbury Dam (also known as Dales Lake Dam) is an earth dam with spillway channels on either end of the embankment.

The embankment is 36 feet high and 565 feet long. The crest is 12 feet wide. There is a cutoff wall under the embankment on the upstream end and there are concrete buttresses within the higher sections of the downstream portion of the embankment. The embankment slopes are 1 vertical on 2.5 horizontal on the upstream slope and 1 vertical on 1.5 horizontal on the downstream slope. The upstream slope is lined with rip-rap.

There are two spillway channels on this dam.. The channel on the eastern end of the dam is considered the service spillway. The upstream portion of this channel is a concrete structure which forms a 27.4 foot long rectangular weir. There is a 5 foot vertical drop beyond the crest of the weir. The remainder of the channel is masonry and laid-up stone. It extends to well beyond the toe of the dam where it joins the auxiliary spillway channel.

The channel at the western end of the embankment is considered to be the auxiliary spillway. The crest of this channel is 2.5 feet above the crest of the service spillway. This channel is 19 feet wide and consists of vertical laid-up stone walls and a masonry channel bottom.

There is a 12 inch diameter reservoir drain which passes through the embankment. Plans indicate that the pipe is about 150 feet long and is surrounded by at least 18 inches of concrete. The control valve for the pipe is located in a gate house which rises from the upstream toe of the embankment. The outlet to this pipe is apparently buried in the downstream slope.

b. Location

The Roxbury Dam is located in the Town of Roxbury off New York State Route 30. The lake is on a private road and is approximately one half mile northwest of the Village of Roxbury.

c. Size Classification

The dam is 36 feet high and has a maximum storage capacity of 101 acre-feet. Therefore, the dam is in the small size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The dam is classified as "high" hazard due to the presence of a number of homes, businesses, and a school located in the village of Roxbury, downstream of the dam.

e. Ownership

The dam is owned by the Chemtex Corporation, 850 Third Avenue, New York, New York 10000. The caretaker of the property for Chemtex is George Boyle of Roxbury.

f. Purpose of Dam

The dam maintains the water level of Dales Lake, which is used for recreational purposes.

g. Design and Construction History

It could not be determined when this structure was originally constructed. The dam was reconstructed in 1912. At that time, a cutoff wall was constructed and additional fill was placed on top of the existing embankment. The auxiliary spillway was reconstructed and the reservoir drain was installed at this time. These modifications were designed by Prof. Charles H. Snow of New York University.

The dam was again reconstructed in 1976. At that time, both of the spillways were modified to increase the spillway capacity. These changes were designed by Richard P. Buck and Associates of Deposit, New York.

h. Normal Operating Procedures

Water flows over the ungated service spillway

1.3 PERTINENT DATA

a. Drainage Area (acres)	515
b. Elevation (USGS Datum)	
Top of Dam	1718.5
Auxiliary Spillway Crest (Western Channel)	1715.5
Service Spillway Crest (Eastern Channel)	1713.0
Invert of Reservoir Drain (estimated)	1692
c. Discharge at Dam (Water Surface @:)	cfs
Service Spillway (1718.5)	1096
Service Spillway (1715.5)	336
Auxiliary Spillway (1718.5)	267
Reservoir Drain - (1713.0)	28

d. Reservoir-Surface Area

	(acres)
Top of Dam	7.8
Auxiliary Spillway Crest	7.0
Service Spillway Crest	5.8

e. Storage Capacity

	(acre-feet)
Top of Dam	101.0
Auxiliary Spillway Crest	79.5
Service Spillway Crest	63.9

f. Dam

Embankment Type - Earth, rock and miscellaneous rubble fill with a cutoff wall and concrete butresses within the fill. Upstream slope lined with riprap and the downstream slope is grass covered.

Embankment Length (ft)	565
Slopes (V:H) Upstream	1 on 2.5
Downstream	1 on 1.5
Crest Width (ft)	12

g. Service Spillway

Type: Concrete channel-rectangular weir. Five foot vertical drop beyond crest. Masonry and laid up stone channel beyond concrete section.
Length: (Weir) 27.4 feet

h. Auxiliary Spillway

Type: Masonry channel with vertical laid up stone sidewalls
Bottom width (feet): 19

i. Reservoir Drain

Type: 12 inch diameter pipe - 150 feet long. Pipe surrounded by 18 inches of concrete. Control valve in gate house which rises from upstream toe of embankment.

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Roxbury Dam is located in the Catskill Mountain physiographic province of New York State. This province is a part of the Appalachian Plateau. The area is underlain by a great thickness of sedimentary rocks from the Devonian Era which lie almost horizontal. Glaciation and the action of streams have carved deep valleys in the flat lying rock. Summit elevations rise to between 3,000 and 4,000 feet. A review of the "Brittle Structures Map of the State of New York" indicated that there are no faults in the immediate vicinity of the dam. The surficial soils and features of the area are the result of glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation.

b. Subsurface Investigations

No records of any subsurface investigations performed for this structure were available. The only information which was available was taken from correspondance concerning the 1912 reconstruction of the dam and from a 1914 dam inspection report. These sources indicated that the soils in the vicinity of the dam were predominantly hardpan (glacial till).

2.2 DESIGN RECORDS

No records were available from the original design of the dam. There was some data available concerning the 1912 reconstruction. Prof. Charles H. Snow of New York University was the designer of these modifications which included the installation of the reservoir drain pipe and reconstruction of the auxiliary spillway channel. Plans and correspondance concerning the modifications were the only design records available for this reconstruction.

Information was also available concerning the 1976 reconstruction. Plans and a permit application prepared by Richard P. Buck and Associates were the primary sources of design data for this reconstruction.

2.3 CONSTRUCTION RECORDS

No information was available concerning the original construction of the dam. There were several photographs and some correspondance concerning the 1912 reconstruction. Plans from that reconstruction as well as the 1976 reconstruction have been included in Appendix F.

2.4 OPERATION RECORDS

There were no operation records available for this dam.

2.5 EVALUATION OF DATA

The data presented in this report was obtained from the Department of Environmental Conservation files. The information available appears to be reliable and adequate for Phase I inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Roxbury Dam was conducted on November 1, 1979. The weather was sunny and the temperature was in the fifties. The reservoir level at the time of the inspection was at the service spillway crest.

b. Embankment

Inspection of the embankment revealed several deficiencies. The most serious of these deficiencies was a wet area on the downstream slope. This wet area was located near the toe in a section where the slope was oversteepened. It appeared to be approximately in line with the reservoir drain pipe although the outlet to this pipe could not be located (it is probably buried). This wet area could therefore be caused by leakage from the pipe. Further investigation will be required to determine the exact cause of this wet area and whether the oversteepened slope in this area creates a stability problem.

There were other deficiencies noted on the embankment. Brush was growing on the upper portion of the upstream slope along the entire length of the dam. There was also brush and some trees growing on the lower part of the downstream slope. One large evergreen tree was growing at the eastern end of the service spillway. If this tree fell; it would block the spillway channel. In addition to the brush and trees, several animal burrow holes were noted on the downstream slope.

c. Service Spillway

Several deficiencies were observed on the service spillway. There was a horizontal crack which ran across the eastern abutment. A large vertical crack was also noted on the downstream face of the same abutment. Concrete had been placed on the surface of each abutment as part of the reconstruction in 1976. The surface of this new concrete was in good condition, but there was substantial honeycombing at the interface between the new and the old concrete. The concrete wall downstream of the west abutment was separated from the abutment by up to 1 1/2 inches at the top. The surface of the concrete on this wall as well as the surfaces on other sections which were not covered by new concrete in 1977 were deteriorated and spalling. The concrete which formed the spillway section itself appeared to be in satisfactory conditions. The remainder of the channel is rock lined, with some brush, grass and small trees growing in the lower portion of the channel.

d. Auxiliary Spillway

The auxiliary spillway also had several deficiencies. Among these is a wooden framework across the inlet to the spillway channel. This framework could trap debris and affect the capacity of the channel. The concrete abutments on either end of the channel were deteriorated. Beyond the crest, the channel was formed by vertical laid-up stone walls for the first 50 feet and was cut into existing ground below that point. The entire channel in this lower portion was filled with brush and small trees.

e. Reservoir Drain

The reservoir drain could not be observed. The gate house for the drain is located approximately 30 feet from the upstream slope. It was not possible to inspect the gate house during this inspection. No outlet of the reservoir drain could be located. As stated in paragraph 3.1b above, it was felt that the outlet to this pipe is buried and might be leaking, causing the wet area on the downstream slope.

3.2 EVALUATION OF OBSERVATIONS

Visual inspection revealed several deficiencies on this structure. The following items were noted:

1. A wet area near the toe of the downstream slope.
2. An oversteepened section of the downstream slope.
3. An inoperable buried outlet and possibly leaking of the reservoir drain.
4. Brush and trees growing on the embankment and in the spillway channels.
5. Animal burrow holes on the downstream slope.
6. Cracks and deterioration of the concrete on the service spillway channel.
7. A separation of the concrete wall from the west abutment of the service spillway.
8. A wood framework across the inlet to the auxiliary spillway channel.

SECTION 4: OPERATION and MAINTENANCE PROCEDURE

4.1 PROCEDURE

There are no established operating procedures for this structure.

4.2 MAINTENANCE OF DAM

The dam is maintained as required. The grass on the embankment is mowed regularly. During the inspection some of the brush in the service spillway channel was being cut. However, there is a need for increasing the maintenance efforts to correct many of the deficiencies outlined in section 3.2.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system is present.

4.4 EVALUATION

The operation procedures appear to be satisfactory. The maintenance procedures are deficient and increased maintenance efforts are required.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed draining into the reservoir pool area was made using the USGS 7.5 minute quadrangle for Roxbury, New York. The drainage area is 515 acres and consists of open fields and wooded lands. Relief in the drainage area is moderate to steep with slopes of over 30 per cent in the northwestern portion of the drainage area.

5.2 ANALYSIS CRITERIA

The analysis of the floodwater retarding capability of this dam was performed using the Corps of Engineers HEC-1 computer program, Dam Safety version. This program develops an inflow hydrograph using the "Clark Unit Hydrograph" method and then uses the "Modified Puls" flood routing procedure. The spillway design flood selected was the Probable Maximum Flood (PMF) in accordance with the Recommended Guidelines of the U.S. Army Corps of Engineers.

5.3 SPILLWAY CAPACITY

The dam has a spillway channel at either end of the embankment. The spillway at the eastern end of the dam is considered to be the service spillway. The crest of this spillway channel is 2.5 feet below the crest of the auxiliary spillway channel. The service spillway was analyzed as a sharp-crested weir with a discharge coefficient (c) of 3.1. The auxiliary spillway channel was analyzed as a broad crested weir with a discharge coefficient (c) of 2.7.

The two spillway channels combined do not have sufficient capacity for discharging the peak outflow from either the PMF or one half the PMF. For the PMF, the peak inflow and the peak outflow are both approximately 4700 cfs. For one half the PMF, the peak inflow and the peak outflow are both about 2400 cfs. The computed spillway capacity for a water surface elevation at the top of the dam is 1362 cfs.

5.4 RESERVOIR CAPACITY

Storage capacity of the reservoir between the service spillway crest and the auxiliary spillway crest is 15.6 acre feet which is equivalent to a runoff depth of 0.36 inches over the drainage area. Additional surcharge storage capacity of 21.5 acre-feet is available between the auxiliary spillway crest and the top of the dam. This is equivalent to a runoff depth of 0.50 inches over the drainage area. The total storage capacity of the dam is 101 acre-feet.

5.5 FLOODS OF RECORD

There were no records available regarding the maximum known flood.

5.6 OVERTOPPING POTENTIAL

Analysis using the PMF and one half the PMF indicates that the dam does not have sufficient spillway capacity. For a PMF peak outflow of 4706 cfs, the dam would be overtopped to a computed depth of 1.33 feet. For the peak outflow from one half the PMF, the depth of overtopping would be 0.64 feet. The dam would be overtopped by all storms exceeding 36% of the PMF inflows.

5.7 EVALUATION

Using the Corps of Engineers screening criteria for initial review of spillway adequacy, it has been determined that the dam would be overtopped by all storms exceeding 36% of the PMF inflows. However, a flood wave analysis indicates that under a given storm, downstream water surface elevations would be almost the same for a breach condition as they would be if the dam did not breach. The maximum difference in the water surface level between the breach and no breach condition would be less than 1 foot.

Since breaching of the dam does not substantially increase the hazard to downstream residents the spillway is adjudged to be inadequate, rather than a more severe assessment.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observations of the structure revealed a number of deficiencies A wet area near the toe of the downstream slope might be caused by leakage through the reservoir drain pipe, whose outlet is apparently buried in the slope. Among the other deficiencies noted were a section of the downstream slope which was steeper than adjacent sections, some deterioration of the concrete on the service spillway channel, and the gap between the downstream wall and the service spillway's concrete west abutment.

b. Data Review and Stability Evaluation

A stability analysis was performed for the service spillway weir. This weir is a concrete section which was modified during the reconstruction of 1976. Information used to perform the stability analysis was obtained from the 1976. The following conditions were analyzed;

a. Normal conditions with the reservoir at spillway crest (elevation 1713)
b. Reservoir level at spillway crest with an ice load of 5,000 lb/ft.
c. Reservoir level at top of dam (elevation 1718.5)

The analyses performed (see Appendix D) indicate that the factors of safety against overturning and sliding are as follows:

Case	Factors of Safety	
	Overturning	Sliding
a. Reservoir at Service Spillway Crest	2.89	12.89
b. Same as (a) plus an ice load of 5,000 lb/ft.	1.00	0.68
c. Reservoir level at top of dam	1.9	1.12

The stability analyses indicate that the stability of the weir section is questionable. The safety factors fall to unacceptable levels when the section is subjected to extreme loading conditions (ice load, high reservoir level).

Further investigations and studies are required to better assess the stability of this section. Based on the results of these analyses, required modifications to the structure should be designed and implemented.

c. Seismic Stability

While there were no known faults in the vicinity of the dam, the history of this area indicates that its seismic probability is more than minor. Therefore, a seismic analysis was performed for the service spillway weir section assuming normal conditions and a seismic coefficient of 0.10. The safety factor against overturning with seismic considerations included was 2.06 and against sliding was 1.57.

Due to the lack of information concerning the embankment materials, no seismic analysis was performed for the embankment section.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I inspection of the Roxbury Dam revealed that the spillway is inadequate and all storms which exceed 36 percent of the PMF inflow would overtop the dam. This overtopping could cause breaching of the dam; however, the resulting floodwave would not significantly increase the hazard to downstream residents from that which would exist just prior to breaching.

In addition to the inadequate spillway capacity, the structural stability analysis indicates that the stability of the service spillway weir is questionable when it is subjected to extreme loading conditions. Other deficiencies noted such as the wet area near the downstream slope and the oversteepened section of the downstream slope could present a hazard unless appropriate repairs are made. The fact that the reservoir drain is inoperable makes these deficiencies more critical.

b. Adequacy of Information

The information which was available for the preparation of this report was adequate.

c. Need for Additional Investigations

Additional investigation is required to find the cause of the wet area at the downstream toe of the embankment and to determine what remedial actions should be taken.

Further analysis of the structural stability of the service spillway weir is also needed. Based on the results of this analysis, required modifications to the structure should be designed and implemented.

d. Urgency

The investigations of the wet area and of the structural stability should be commenced within 3 months of the date of notification of the owner. Remedial actions deemed necessary based on the results of the investigations should be completed within 12 months of the notification. The other deficiencies noted below should also be corrected within 12 months.

7.2 RECOMMENDED MEASURES

a. Upon completion of the investigation of the wet area near the toe of the slope appropriate remedial measures should be taken.

b. Based on the results of the structural stability analysis, the service spillway weir should be modified as required.

c. The oversteepened section of the downstream slope should be studied to determine if there is a stability problem.

d. The reservoir drain should be made operable

e. Brush and trees growing on the embankment and in the spillway channels should be cut and removed.

f. Animal burrow holes on the downstream slope should be filled.

g. The wood framework which is across the inlet to the auxiliary spillway channel should be removed.

h. The deterioration of the concrete and separation of the concrete wall from the west abutment on the service spillway channel should be repaired.

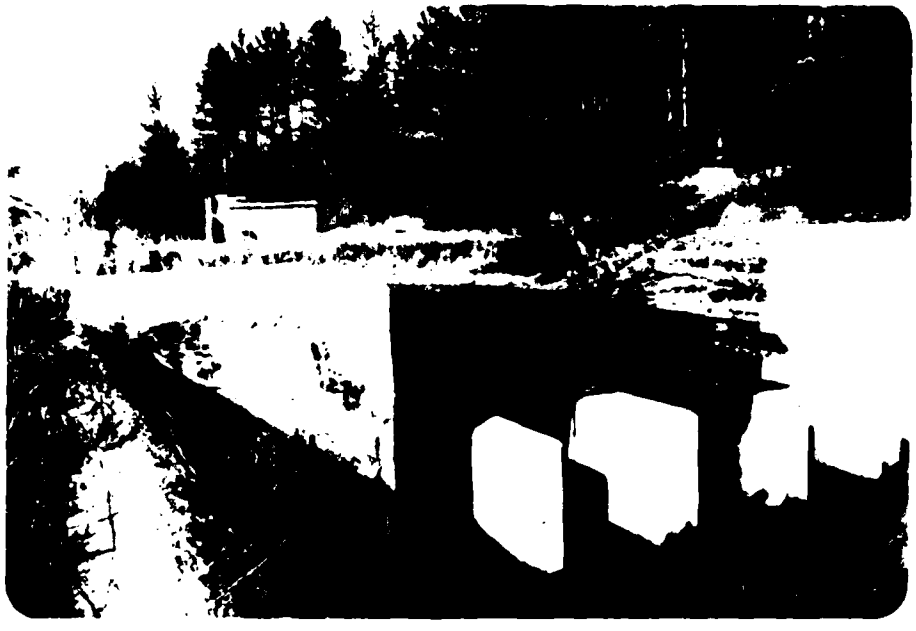
i. Develop an emergency action plan for notification of downstream residents and the proper authorities in the event of a dam failure.

APPENDIX A

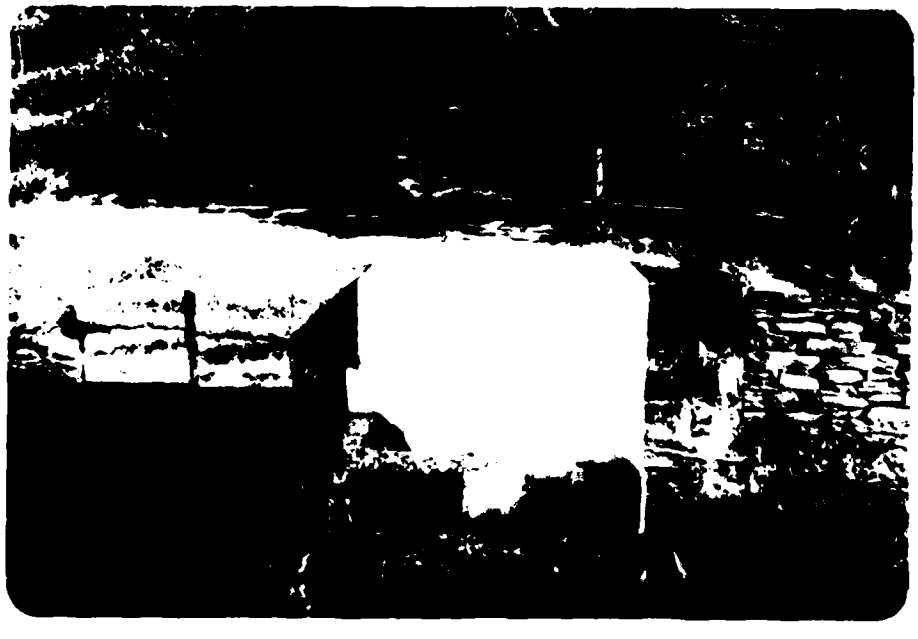
PHOTOGRAPHS

Service Spillway Channel Looking Downstream - Note Large Tree on Left

Service Spillway Weir - Looking Upstream - Note Cracks on East Abutment



Service Spillway Weir - Note Honeycombed Concrete on Western Abutment



East Abutment on Service Spillway - Note Crack Running Across Abutment

Crest of Auxiliary Spillway - Note Wood Framework Across Inlet

Auxiliary Spillway Channel - Note Brush and Birch Trees Growing in Channel

West Abutment of Service Spillway Weir - Note Separation Between Abutment and Wingwall

Exit Channel For Service Spillway - Note Grass and Brush in Channel

Crest of Auxiliary Spillway - Note Wood Framework Across Inlet

Auxiliary Spillway Channel - Note Brush and Birch Trees Growing in Channel

Downstream Slope - Note Trees Growing Near Downstream Toe

Wet Area and Oversteepened Section of Slope

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam ROXBURY DAM (DALES LAKE DAM)

Fed. I.D. # 788 DEC Dam No. 160D-646

River Basin DELAWARE

Location: Town ROXBURY County DELAWARE

Stream Name UNNAMED

Tributary of DELAWARE RIVER

Latitude (N) 42° 18.5' Longitude (W) 74° 34.2'

Type of Dam EARTH

Hazard Category C

Date(s) of Inspection 11/1/79

Weather Conditions 50° SUNNY

Reservoir Level at Time of Inspection AT SERVICE SPILLWAY CREST

b. Inspection Personnel R. WARRENDER W. LYNICK

c. Persons Contacted (Including Address & Phone No.)

d. History:

Date Constructed ? Date(s) Reconstructed 1912

1976

Designer C.H. SNOW / R.P BUCK

Constructed By

Owner CHEMTEX CORP.

2) Embankment

a. Characteristics

(1) Embankment Material EARTH

(2) Cutoff Type PUDDLE WALL CUTOFF

(3) Impervious Core NONE

(4) Internal Drainage System NONE

(5) Miscellaneous

b. Crest

(1) Vertical Alignment SLIGHTLY UNEVEN - GENERALLY SATISFACTORY

(2) Horizontal Alignment CURVED

(3) Surface Cracks NONE APPARENT

(4) Miscellaneous

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1 ON 2½

(2) Undesirable Growth or Debris, Animal Burrows LIGHT BRUSH GROWING ALONG ENTIRE SLOPE AT CREST ELEVATION - LARGE EVERGREEN GROWING ON EAST ABUTMENT NEXT TO SPILLWAY

(3) Sloughing, Subsidence or Depressions NONE

(4) Slope Protection LIGHT RIPRAP FROM CREST DOWN

(5) Surface Cracks or Movement at Toe NONE OBSERVED

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 ON 1½

(2) Undesirable Growth or Debris, Animal Burrows MOSTLY MOWED GRASS SOME ANIMAL BURROWS & LIGHT BRUSH IN OVERSTEEPENED SECTION

(3) Sloughing, Subsidence or Depressions NONE

(4) Surface Cracks or Movement at Toe NONE

(5) Seepage WET AREA AT TOE - POSSIBLY DUE TO SEEPAGE FROM BURIED RESERVOIR DRAIN OUTLET

(6) External Drainage System (Ditches, Trenches; Blanket) NONE

(7) Condition Around Outlet Structure POSSIBLE SEEPAGE FROM RESERVOIR DRAIN

(8) Seepage Beyond Toe NONE

e. Abutments - Embankment Contact

(1) Erosion at Contact NONE

(2) Seepage Along Contact NONE

3) Drainage System

a. Description of System NONE

b. Condition of System

c. Discharge from Drainage System

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

NONE

5) Reservoir

a. Slopes SATISFACTORY

b. Sedimentation NONE APPARENT

c. Unusual Conditions Which Affect Dam WATER LEVEL ROSE & FELL ~~SLIGHTLY~~ ~~ABOUT~~ 1" SLIGHTLY EVERY FEW MINUTES - FAUCET EFFECT

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) STEEP HILL - PASSES UNDER 2 SMALL ROADS & INTO ROXBURY

b. Seepage, Unusual Growth NONE

c. Evidence of Movement Beyond Toe of Dam NONE

d. Condition of Downstream Channel ROCK LINED (OUTCROP) CHANNEL DOWN OFF THE HILL - ONE WATERFALL IN CHANNEL

7) Spillway(s) (Including Discharge Conveyance Channel)

a. General ONE SPILLWAY CHANNEL AT EITHER END OF STRUCTURE SERVICE AT EASTERN END AUXILIARY ON WESTERN.

b. Condition of Service Spillway MEASURED DIMENSIONS 27.4' ACROSS 5'10" HIGH NEW CONCRETE OVER OLD INTERFACE IS HONEY COMBED

CHANNEL IS ROCK LINED WITH LIGHT BRUSH AND TREES GROWING UP THROUGH INVERT FOR ENTIRE CHANNEL

c. Condition of Auxiliary Spillway IRREGULAR PLACED STONE - INVERT UPSTREAM OF WEIR SATISFACTORY - DOWNSTREAM OF WEIR CHANNEL IS FULL OF BRUSH & TREES. STONE WALLS FOR FIRST 50' THEN CUT IN EARTH FOR THE REMAINDER

d. Condition of Discharge Conveyance Channel _____

8) Reservoir Drain/Outlet

Type: Pipe √ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other _____

Size: 12" Length 150'

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): Unobservable √

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate √ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other ?

Present Condition (Describe): COULD NOT BE OBSERVED OUTLET COULD NOT BE LOCATED.

9) Structural

a. Concrete Surfaces NEW SURFACES WERE SATISFACTORY- THE OLD ONES WERE DETERIORATED

b. Structural Cracking LARGE HORIZONTAL CRACK RUNNING ALONG EAST ABUT. WALL ON SERVICE SPILLWAY ALSO HAS A LARGE CRACK EXTENDING FROM TOP OF ABUTMENT TO THE BOTTOM

c. Movement - Horizontal & Vertical Alignment (Settlement) NONE APPARENT

d. Junctions with Abutments or Embankments AUX. SPILLWAY - CONCRETE ABUTMENTS DETERIORATED ON SURFACE

SERVICE SPILLWAY- RIGHT DOWNSTREAM WALL ENTIRELY SEPARATED BY UP TO 1½" FROM WEST SPILLWAY ABUTMENT - ALSO HAS A VOID ON EMBANKMENT SIDE WHICH RUNS THE LENGTH OF THE WALL.

e. Drains - Foundation, Joint, Face NONE

f. Water Passages, Conduits, Sluices DRAIN WAS UNOBSERVABLE

g. Seepage or Leakage DRAIN SEEMED TO BE LEAKING

h. Joints - Construction, etc. HONEY COMBING WHERE NEW CONCRETE WAS PLACED OVER OLD CONCRETE

i. Foundation

j. Abutments

k. Control Gates

l. Approach & Outlet Channels SERVICE SPILLWAY - BATTERED CONCRETE WALL & THEN FIELDSTONE WALL - ADEQUATELY BATERED AUX. SPILLWAY - FIELDSTONE SOMEWHAT MOVEABLE BUT BATTERED DOWNSTREAM END OF CHANNEL IS CRUMBLING

m. Energy Dissipators (Plunge Pool, etc.) SERVICE SPILLWAY - NATURAL DROP ONTO CONCRETE APRON AT 4 OLD PIERS

n. Intake Structures

o. Stability

p. Miscellaneous

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1718.5	7.80	101
2) Design High Water (Max. Design Pool)			
3) Auxiliary Spillway Crest	1715.5	7.00	79.5
4) Pool Level with Flashboards			
5) Service Spillway Crest	1713	5.80	64

DISCHARGES

	Volume (cfs)
1) Average Daily	
2) Service Spillway @ Maximum High Water	1095.6
3) Auxiliary Spillway @ Maximum High Water	266.6
4) Spillway @ Auxiliary Spillway Crest Elevation	335.7
5) Low Level Outlet At Maximum High Water	31.9
6) Total (of all facilities) @ Maximum High Water	1362.2
7) Maximum Known Flood	

CREST: **ELEVATION:** 1718.5

Type: EARTH

Width: 12 Length: 565

Spillover SERVICE - CONCRETE WEIR AUXILIARY - EARTH BROAD CREST WEIR

Location EAST END WEST END

SPILLWAY:

PRINCIPAL		EMERGENCY
1713	Elevation	1715.5
SHARP CRESTED 1' WIDE	Type	BROAD CRESTED
27.4'	Width	19'
	Type of Control	
✓	Uncontrolled	✓
	Controlled:	
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
	Chute Length	
>3'	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	<1'

OUTLET STRUCTURES/EMERGENCY DRAWDOWN FACILITIES:

Type: Gate ✓ Sluice _____ Conduit _____ Penstock _____

Shape : ROUND

Size: 12 INCH

Elevations: Entrance Invert 1690±

Exit Invert ?

Tailrace Channel: Elevation _____

HYDROMETEROLOGICAL GAGES:

Type : NONE

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

_____

Method of Controlled Releases (mechanisms):

POSSIBLY RESERVOIR DRAIN BUT IT APPEARS TO BE INOPERABLE

DRAINAGE AREA: 555 ACRES

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: FOREST & GOLF COURSE

Terrain - Relief: STEEP, FORESTED

Surface - Soil: _____

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

NONE

Potential Sedimentation problem areas (natural or man-made; present or future)

NONE

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

NONE

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: NONE

Elevation: _____

Reservoir:

Length @ Maximum Pool _____ (Miles)

Length of Shoreline (@ Spillway Crest) _____ (Miles)

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
ROXBURY DAM	1		
SUBJECT		**COMPUTED BY**	**DATE**
HYDROLOGIC / HYDRAULIC DAM		RLW	2/13/80

DRAINAGE AREA = 515 ACRES = .80 SQ. MI.

ROXBURY QUADRANGLE 5.61 IN² ⇒ 515 ACRES

CLARK HYDROGRAPH COEFFICIENTS

L = 9100 ft − 1000 ft = 8100 ft ⇒ 1.53 mi.

$S_t = .5\%$

$S_{10/85} = \frac{2500 - 1713}{1.29} = 610$ ft/mi

$TC = \frac{(5.33)(L^{.602})(S_t^{.231})}{S_{10/85}^{.448}} = \frac{(5.33)(1.53^{.602})(.5^{.231})}{610^{.448}} = .33$ ROUND TO TC = .5

$R = \frac{(17.6)(L^{.339})(S_t^{.258})}{S_{10/85}^{.86}} = \frac{17.6(1.53^{.339})(.5^{.258})}{610^{.86}} = .068$ ROUND TO R = .1

TP-40 PMH RAINFALL

PMP RAINFALL (6 HOUR − 10 SQ MI) = 23 IN

6 HR = 100% 24 HR = 119%

12 HR = 111% 48 HR = 128%

$TRSPC = 1 - \frac{.3008}{(.80)^{.1718}} = .686$

LOSS DATA: 1.0" CONTINUOUS = .1"

BASE FLOW = 2 cfs

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
ROXBURY DAM	2		
SUBJECT		COMPUTED BY	DATE
HYDROLOGIC / HYDRAULIC COMPUTATIONS		RLW	2/13/80

ELEVATIONS

TOP OF DAM 1718.5

AUX. SPILLWAY CREST 1715.5

SERVICE SPILLWAY CREST 1713.0

SURFACE AREAS AT VARIOUS ELEVATIONS

ELEVATION	SURFACE AREA (ACRES)
1720*	8.19*
1718.5	7.80
1717.5	7.50
1715.5	7.00
1713.0	5.80

* THIS SURFACE AREA WAS PLANIMETERED FROM RICHARD BUCK PLANS DATED 6/16/76. OTHER ELEVATIONS AND SURFACE AREAS WERE TAKEN FROM THE 1976 APPLICATION FOR PERMIT.

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
ROXBURY DAM	3		
SUBJECT		**COMPUTED BY**	**DATE**
HYDROLOGIC / HYDRAULIC COMPUTATIONS		RLW	2/13/80

DISCHARGE CAPACITY

SERVICE SPILLWAY CHANNEL

Use $C = 3.1$ $L = 27.4'$

WATER SURFACE AT AUXILIARY SPILLWAY CREST

$Q = (3.1)(27.4 ft)(2.5)^{3/2} = 335.7$ cfs

WATER SURFACE AT TOP OF DAM

$Q = (3.1)(27.4)(5.5)^{3/2} = 1095.6$ cfs

AUXILIARY SPILLWAY CHANNEL

WATER SURFACE AT TOP OF DAM

Use $C = 2.7$ $L = 19$

$Q = (2.7)(19)(3)^{3/2} = 266.6$ cfs

RESERVOIR DRAIN CAPACITY

WATER SURFACE AT SERVICE SPILLWAY CREST

$Q = .78\sqrt{2(32.2)(30.5)} = 28.3$ cfs

```
*****************************************              *********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)                       NEW YORK STATE
DAM SAFETY VERSION      JULY 1978                      DEPT OF ENVIRONMENTAL CONSERVATION
  LAST MODIFICATION  2 FEB 79                          FLOOD PROTECTION BUREAU
  MODIFIED FOR HONEYWELL 2 APR 79
*****************************************              *********************************
   1          A1 PRIMARY DAM
   2          A  OF WITH RATIOS - ANALYSIS
   3          A3 DATE
   4          B    200      0     10      0      0      0      0      0      0      0
   5          B1     5
   6          J      1      3      1
   7          J1   .30     .5    1.0
   8          K      0      1                                   1
   9          K1                          INFLOW HYDROGRAPH
  10          M      1      0     .8                   .69                   1
  11          P      0     23    100    111    119    128
  12          T                                               1    .06
  13          V     .5     .1
  14          X      2      1    3.5
  15          K      1      1                                   1
  16          K  ROUTED HYDROGRAPH AT DAM  NO BREACH
  17          Y                           1      1
  18          Y      1                                      -1713     -1
  19          Y   1713 1715.5   1717 1718.5
  20          Y4     0    356    774   1362
  21          $      0   63.9   79.5   93.4    101
  22          $   1680   1713 1715.5 1717.5 1718.5
  23          $   1713
  24          $ 1713.5    3.3    1.5    615
  25          K      1     50
  26          K1 LOCATION TOE OF DAM
  27          Y                           1      1
  28          Y1     1
  29          Y    .05    .05    .05   1682   1720     50    .73
                   [illegible]                                 270   1682    285   1682
```

[illegible]		1625	[illegible]	1685	630	1720				
K	1	1000								

K[illegible] LOCATION HILLSIDE

[illegible]				1	1					
[illegible]	1									
[illegible]	[illegible]	.05	.05	1617	1660	1000	.065			
[illegible]	[illegible]	1600	[illegible]	1640	110	1620	115	1617	125	1617
[illegible]	1[illegible]	1620	190	1640	220	1660				
[illegible]	1	2000								

[illegible] LOCATION ROAD CROSSING

[illegible]				1	1					
[illegible]	1									
[illegible]	[illegible]	.05	[illegible]	1515	1600	1000	.10			
[illegible]		1600	405	1560	780	1520	780	1515	795	1515
[illegible]	7[illegible]	1520	1000	1540	1200	1600				
[illegible]	1	3000								

[illegible] LOCATION JUNCTION WITH EAST BRANCH OF DELAWARE

[illegible]				1	1					
[illegible]	[illegible]									
[illegible]	[illegible]	.05	[illegible]	1470	1520	1000	.04			
[illegible]		1520	5	1500	1050	1475	1050	1470	1065	1470
[illegible]	10[illegible]	1475	2[illegible]	1500	2150	1520				

FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION
LAST MODIFICATION
MODIFIED FOR ONE FILE

NEW YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU

RUN DATE 02/25/80

[illegible]
[illegible] ATIONS - ANALYSIS
DATE 2/26/80

JOB SPECIFICATION

NO	NC	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
.00	0	10	0	0	0	0	0	0	0

JSPER	NRT	LROPT	TRACE
5	0	0	0

[illegible]-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 3 LRTIO= 1
RTIO= 0.35 0.50 1.00

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	0	0.50	0.	0.60	0.69	0.	0	1	0

PRECIP DATA

SCFE	PMS	R6	R12	R24	R48	R72	R96
0.	23.00	100.00	111.00	119.00	128.00	0.	0.

LOSS DATA

LROPT	STRTL	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.	0.	1.00	0.	0.	1.00	1.00	0.06	0.	0.

UNIT HYDROGRAPH DATA
TP= 0.50 CP= 0.10 NTA= 0

RECESSION DATA
STRTQ= 2.00 QRCSN= 1.00 RTIOR= 3.50

[illegible] HYD [illegible]-AREA 5 END-OF-PERIOD ORDINATES, LAG= 0.31 HOURS, CP= 0.74 VOL= 1.00
263. 1[illegible]. 1121. 485. 99.

END-OF-PERIOD FLOW

[illegible]	HR.MN	PERIOD	[illegible]	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.10	1	[illegible]	0.	[illegible]	2.	1.02	0.10	145	0.01	0.00	0.01	2.
1.01	0.20	2	[illegible]	0.	[illegible]	2.	1.02	0.20	146	0.01	0.00	0.01	6.
1.01	0.30	3	[illegible]	0.	0.00	1.	1.02	0.30	147	0.01	0.00	0.01	11.
1.01	.40	4	[illegible]	0.	[illegible]	1.	1.02	0.40	148	0.01	0.00	0.01	13.
1.01	.50	5	[illegible]	0.	[illegible]	1.	1.02	0.50	149	0.01	0.00	0.01	12.

1.	1.10	[illegible]	[illegible]	[illegible]	[illegible]	1.	1.02	1.10	151	0.01	0.00	0.01	13.
1.	1.20	[illegible]	[illegible]	[illegible]	[illegible]	1.	1.02	1.20	152	0.01	0.00	0.01	13.
1.	1.30	[illegible]	[illegible]	[illegible]	[illegible]	1.	1.02	1.30	153	0.01	0.00	0.01	13.
1.	1.40	10	[illegible]	[illegible]	[illegible]	1.	1.02	1.40	154	0.01	0.00	0.01	13.
1.	1.50	11	[illegible]	[illegible]	[illegible]	1.	1.02	1.50	155	0.01	0.00	0.01	13.
1.	2.00	12	[illegible]	[illegible]	[illegible]	0.	1.02	2.00	156	0.01	0.00	0.01	13.
1.	2.10	13	[illegible]	[illegible]	[illegible]	0.	1.02	2.10	157	0.01	0.00	0.01	13.
1.	2.20	14	[illegible]	[illegible]	[illegible]	0.	1.02	2.20	158	0.01	0.00	0.01	13.
1.	2.30	15	[illegible]	[illegible]	[illegible]	0.	1.02	2.30	159	0.01	0.00	0.01	13.
1.	2.40	16	[illegible]	[illegible]	[illegible]	0.	1.02	2.40	160	0.01	0.00	0.01	13.
1.	2.50	17	[illegible]	[illegible]	[illegible]	0.	1.02	2.50	161	0.01	0.00	0.01	13.
1.	3.00	18	[illegible]	[illegible]	[illegible]	0.	1.02	3.00	162	0.01	0.00	0.01	13.
1.	3.10	19	[illegible]	[illegible]	[illegible]	0.	1.02	3.10	163	0.01	0.00	0.01	13.
1.	3.20	20	[illegible]	[illegible]	[illegible]	0.	1.02	3.20	164	0.01	0.00	0.01	13.
1.	3.30	21	[illegible]	[illegible]	[illegible]	0.	1.02	3.30	165	0.01	0.00	0.01	13.
1.	3.40	22	[illegible]	[illegible]	[illegible]	0.	1.02	3.40	166	0.01	0.00	0.01	13.
1.	3.50	23	[illegible]	[illegible]	[illegible]	0.	1.02	3.50	167	0.01	0.00	0.01	13.
1.	4.00	24	[illegible]	[illegible]	[illegible]	0.	1.02	4.00	168	0.01	0.00	0.01	13.
1.	4.10	25	[illegible]	[illegible]	[illegible]	0.	1.02	4.10	169	0.01	0.00	0.01	13.
1.	4.20	26	[illegible]	[illegible]	[illegible]	0.	1.02	4.20	170	0.01	0.00	0.01	13.
1.	4.30	27	[illegible]	[illegible]	[illegible]	0.	1.02	4.30	171	0.01	0.00	0.01	13.
1.	4.40	28	[illegible]	[illegible]	[illegible]	0.	1.02	4.40	172	0.01	0.00	0.01	13.
1.	4.50	29	[illegible]	[illegible]	[illegible]	0.	1.02	4.50	173	0.01	0.00	0.01	13.
1.	5.00	30	[illegible]	[illegible]	[illegible]	0.	1.02	5.00	174	0.01	0.00	0.01	13.
1.	5.10	31	[illegible]	[illegible]	[illegible]	0.	1.02	5.10	175	0.01	0.00	0.01	13.
1.	5.20	32	[illegible]	[illegible]	[illegible]	0.	1.02	5.20	176	0.01	0.00	0.01	13.
1.	5.30	33	[illegible]	[illegible]	[illegible]	0.	1.02	5.30	177	0.01	0.00	0.01	13.
1.	5.40	34	[illegible]	[illegible]	[illegible]	0.	1.02	5.40	178	0.01	0.00	0.01	13.
1.	5.50	35	[illegible]	[illegible]	[illegible]	0.	1.02	5.50	179	0.01	0.00	0.01	13.
1.	6.00	36	[illegible]	[illegible]	[illegible]	0.	1.02	6.00	180	0.01	0.00	0.01	13.
1.	6.10	37	[illegible]	[illegible]	[illegible]	0.	1.02	6.10	181	0.05	0.04	0.01	26.
1.	6.20	38	[illegible]	[illegible]	[illegible]	0.	1.02	6.20	182	0.05	0.04	0.01	62.
1.	6.30	39	[illegible]	[illegible]	[illegible]	0.	1.02	6.30	183	0.05	0.04	0.01	101.
1.	6.40	40	[illegible]	[illegible]	[illegible]	0.	1.02	6.40	184	0.05	0.04	0.01	117.
1.	6.50	41	[illegible]	[illegible]	[illegible]	0.	1.02	6.50	185	0.05	0.04	0.01	119.
1.	7.00	42	[illegible]	[illegible]	[illegible]	0.	1.02	7.00	186	0.05	0.04	0.01	119.
1.	7.10	43	[illegible]	[illegible]	[illegible]	0.	1.02	7.10	187	0.05	0.04	0.01	119.
1.	7.20	44	[illegible]	[illegible]	[illegible]	0.	1.02	7.20	188	0.05	0.04	0.01	119.
1.	7.30	45	[illegible]	[illegible]	[illegible]	0.	1.02	7.30	189	0.05	0.04	0.01	119.
1.	7.40	46	[illegible]	[illegible]	[illegible]	0.	1.02	7.40	190	0.05	0.04	0.01	119.
1.	7.50	47	[illegible]	[illegible]	[illegible]	0.	1.02	7.50	191	0.05	0.04	0.01	119.
1.	8.00	48	[illegible]	[illegible]	[illegible]	0.	1.02	8.00	192	0.05	0.04	0.01	119.
1.	8.10	49	[illegible]	[illegible]	[illegible]	0.	1.02	8.10	193	0.05	0.04	0.01	119.
1.	8.20	50	[illegible]	[illegible]	[illegible]	0.	1.02	8.20	194	0.05	0.04	0.01	119.
1.	8.30	51	[illegible]	[illegible]	[illegible]	0.	1.02	8.30	195	0.05	0.04	0.01	119.
1.	8.40	52	[illegible]	[illegible]	[illegible]	0.	1.02	8.40	196	0.05	0.04	0.01	119.
1.	8.50	53	[illegible]	[illegible]	[illegible]	0.	1.02	8.50	197	0.05	0.04	0.01	119.
1.	9.00	54	[illegible]	[illegible]	[illegible]	0.	1.02	9.00	198	0.05	0.04	0.01	119.
1.	9.10	55	[illegible]	[illegible]	[illegible]	0.	1.02	9.10	199	0.05	0.04	0.01	119.
1.	9.20	56	[illegible]	[illegible]	[illegible]	0.	1.02	9.20	200	0.05	0.04	0.01	119.
1.	[illegible]	57	[illegible]	[illegible]	[illegible]	0.	0.	0.	201	0.05	0.04	0.01	119.
1.	[illegible]	58	[illegible]	[illegible]	[illegible]	0.	0.	0.	202	0.05	0.04	0.01	119.
1.	[illegible]	59	[illegible]	[illegible]	[illegible]	0.	0.	0.	203	0.05	0.04	0.01	119.
1.	10.00	60	[illegible]	[illegible]	[illegible]	0.	0.	0.	204	0.05	0.04	0.01	119.
1.	10.10	61	[illegible]	[illegible]	[illegible]	0.	0.	0.	205	0.05	0.04	0.01	119.
1.	10.20	62	[illegible]	[illegible]	[illegible]	0.	0.	0.	206	0.05	0.04	0.01	119.
1.	10.30	63	[illegible]	[illegible]	[illegible]	0.	0.	0.	207	0.05	0.04	0.01	119.
1.	10.40	64	[illegible]	[illegible]	[illegible]	0.	0.	0.	208	0.05	0.04	0.01	119.
1.	10.50	65	[illegible]	[illegible]	[illegible]	0.	0.	0.	209	0.05	0.04	0.01	119.
1.	11.00	66	[illegible]	[illegible]	[illegible]	0.	0.	0.	210	0.05	0.04	0.01	119.
1.	11.10	67	[illegible]	[illegible]	[illegible]	0.	0.	0.	211	0.05	0.04	0.01	119.
1.	11.20	68	[illegible]	[illegible]	[illegible]	0.	0.	0.	212	0.05	0.04	0.01	119.
1.	11.30	69	[illegible]	[illegible]	[illegible]	0.	0.	0.	213	0.05	0.04	0.01	119.
1.	[illegible]	70	[illegible]	[illegible]	[illegible]	0.	0.	0.	214	0.05	0.04	0.01	119.
1.	[illegible]	71	[illegible]	[illegible]	[illegible]	0.	0.	0.	215	0.05	0.04	0.01	119.

1.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.	0.	217	0.26	0.25	0.01	292.
[illegible]	[illegible]	[illegible]	0.02	0.	0.02	[illegible]	0.	0.	218	0.26	0.25	0.01	431.
1.[illegible]	12.[illegible]	[illegible]	0.02	0.	0.02	[illegible]	0.	0.	219	0.26	0.25	0.01	673.
1.[illegible]	12.[illegible]	7[illegible]	0.02	0.	0.02	[illegible]	0.	0.	220	0.26	0.25	0.01	777.
1.01	12.[illegible]	77	0.02	0.	0.02	[illegible]	0.	0.	221	0.26	0.25	0.01	787.
1.01	13.[illegible]	7[illegible]	0.02	0.	0.02	[illegible]	0.	0.	222	0.26	0.25	0.01	787.
1.01	13.1	7[illegible]	0.02	0.	0.02	[illegible]	0.	0.	223	0.32	0.31	0.01	807.
1.0[illegible]	13.2[illegible]	[illegible]	0.02	0.	0.02	0.	0.	0.	224	0.32	0.31	0.01	863.
1.0[illegible]	13.[illegible]	[illegible]1	0.02	0.	0.02	0.	0.	0.	225	0.32	0.31	0.01	922.
1.0[illegible]	13.[illegible]	[illegible]2	0.02	0.	0.02	0.	0.	0.	226	0.32	0.31	0.01	948.
1.0[illegible]	13.[illegible]	[illegible]	0.02	0.	0.02	0.	0.	0.	227	0.32	0.31	0.01	950.
1.0[illegible]	14.[illegible]	[illegible]	0.02	0.	0.02	0.	0.	0.	228	0.32	0.31	0.01	950.
1.0[illegible]	14.1[illegible]	[illegible]	0.03	0.	0.03	0.	0.	0.	229	0.40	0.39	0.01	981.
1.0[illegible]	14.[illegible]	[illegible]	0.03	0.	0.03	0.	0.	0.	230	0.40	0.39	0.01	1065.
1.0[illegible]	14.[illegible]	[illegible]	0.03	0.	0.03	0.	0.	0.	231	0.40	0.39	0.01	1154.
1.0[illegible]	14.[illegible]	[illegible]	0.03	0.	0.03	0.	0.	0.	232	0.40	0.39	0.01	1192.
1.0[illegible]	14.[illegible]	[illegible]	0.03	0.	0.03	0.	0.	0.	233	0.40	0.39	0.01	1196.
1.0[illegible]	15.[illegible]	[illegible]	0.03	0.	0.03	0.	0.	0.	234	0.40	0.39	0.01	1196.
1.0[illegible]	15.1[illegible]	[illegible]1	0.03	0.	0.03	0.	0.	0.	235	0.36	0.35	0.01	1182.
1.0[illegible]	15.[illegible]	[illegible]2	0.05	0.	0.05	0.	0.	0.	236	0.60	0.59	0.01	1238.
1.0[illegible]	15.[illegible]	[illegible]	0.08	0.	[illegible]	0.	0.	0.	237	1.09	1.03	0.01	1639.
1.0[illegible]	15.[illegible]	[illegible]	0.21	0.	0.21	0.	0.	0.	238	2.71	2.70	0.01	3027.
1.01	15.[illegible]	[illegible]	0.05	0.03	0.03	11.	0.	0.	239	0.78	0.77	0.01	4668.
1.0[illegible]	15.[illegible]	[illegible]	0.04	0.03	0.01	[illegible]	0.	0.	240	0.48	0.47	0.01	4578.
1.0[illegible]	16.1[illegible]	[illegible]	0.03	0.02	0.01	67.	0.	0.	241	0.37	0.36	0.01	2864.
1.0[illegible]	16.2[illegible]	[illegible]	0.03	0.02	0.01	[illegible]	0.	0.	242	0.37	0.36	0.01	1543.
1.0[illegible]	16.[illegible]	[illegible]	0.03	0.02	0.01	40.	0.	0.	243	0.37	0.35	0.01	1187.
1.0[illegible]	16.[illegible]	1[illegible]	0.03	0.02	0.01	[illegible]	0.	0.	244	0.37	0.36	0.01	1119.
1.0[illegible]	16.[illegible]	1[illegible]1	0.03	0.02	0.01	[illegible]	0.	0.	245	0.37	0.36	0.01	1114.
1.01	17.[illegible]	1[illegible]2	0.03	0.02	0.01	[illegible]	0.	0.	246	0.37	0.36	0.01	1114.
1.0[illegible]	17.1	1[illegible]	0.02	0.01	0.01	73.	0.	0.	247	0.29	0.28	0.01	1084.
1.0[illegible]	17.[illegible]	1[illegible]	0.02	0.01	0.01	47.	0.	0.	248	0.29	0.28	0.01	999.
1.0[illegible]	17.[illegible]	1[illegible]	0.02	0.01	0.01	40.	0.	0.	249	0.29	0.28	0.01	911.
1.[illegible]	17.[illegible]	1[illegible]	0.02	0.01	0.01	[illegible]	0.	0.	250	0.29	0.28	0.01	872.
1.01	17.50	1[illegible]7	0.02	0.01	0.01	[illegible]7.	0.	0.	251	0.29	0.28	0.01	869.
1.0[illegible]	1[illegible]	1[illegible]	0.02	0.01	0.01	37.	0.	0.	252	0.29	0.28	0.01	869.
1.0[illegible]	1[illegible]	1[illegible]	0.00	0.	0.00	3[illegible].	0.	0.	253	0.02	0.01	0.01	765.
1.01	1[illegible]	11[illegible]	0.00	0.	0.00	20.	0.	0.	254	0.02	0.01	0.01	480.
1.0[illegible]	1[illegible]	111	0.00	0.	0.00	6.	0.	0.	255	0.02	0.01	0.01	177.
1.0[illegible]	1[illegible]	112	0.00	0.	0.00	1.	0.	0.	256	0.02	0.01	0.01	46.
1.0[illegible]	1[illegible]	11[illegible]	0.00	0.	0.00	1.	0.	0.	257	0.02	0.01	0.01	35.
1.0[illegible]	19.[illegible]	11[illegible]	0.00	0.	0.00	1.	0.	0.	258	0.02	0.01	0.01	35.
1.[illegible]	19.[illegible]	115	0.00	0.	0.00	1.	0.	0.	259	0.02	0.01	0.01	35.
1.[illegible]	19.[illegible]	11[illegible]	0.00	0.	0.00	1.	0.	0.	260	0.02	0.01	0.01	35.
1.[illegible]	1[illegible]	117	0.00	0.	0.00	1.	0.	0.	261	0.02	0.01	0.01	35.
1.01	19.[illegible]	11[illegible]	0.00	0.	0.00	0.	0.	0.	262	0.02	0.01	0.01	35.
1.0[illegible]	1[illegible]	11[illegible]	0.00	0.	0.00	0.	0.	0.	263	0.02	0.01	0.01	35.
1.01	20.[illegible]	12[illegible]	0.00	0.	0.00	0.	0.	0.	264	0.02	0.01	0.01	35.
1.01	20.[illegible]	121	0.00	0.	0.00	0.	0.	0.	265	0.02	0.01	0.01	35.
1.0[illegible]	20.[illegible]	122	0.00	0.	0.00	0.	0.	0.	266	0.02	0.01	0.01	35.
1.0[illegible]	20.[illegible]	12[illegible]	0.00	0.	0.00	0.	0.	0.	267	0.02	0.01	0.01	35.
1.0[illegible]	20.[illegible]	12[illegible]	0.00	0.	0.00	0.	0.	0.	268	0.02	0.01	0.01	35.
1.0[illegible]	20.5[illegible]	125	0.00	0.	0.00	0.	0.	0.	269	0.02	0.01	0.01	35.
1.01	21.[illegible]	12[illegible]	0.00	0.	0.00	0.	0.	0.	270	0.02	0.01	0.01	35.
1.01	21.1[illegible]	127	0.00	0.	0.00	0.	0.	0.	271	0.02	0.01	0.01	35.
1.01	21.2[illegible]	12[illegible]	0.00	0.	0.00	0.	0.	0.	272	0.02	0.01	0.01	35.
1.0[illegible]	21.3[illegible]	1[illegible]	0.00	0.	0.00	0.	0.	0.	273	0.02	0.01	0.01	35.
1.01	21.4[illegible]	1[illegible]	0.00	0.	0.00	0.	0.	0.	274	0.02	0.01	0.01	35.
1.01	21.5[illegible]	1[illegible]	0.00	0.	0.00	0.	0.	0.	275	0.02	0.01	0.01	35.
1.01	22.0[illegible]	1[illegible]2	0.00	0.	0.00	0.	0.	0.	276	0.02	0.01	0.01	35.
1.01	22.1[illegible]	1[illegible]	0.00	0.	0.00	0.	0.	0.	277	0.02	0.01	0.01	35.
1.01	22.2[illegible]	1[illegible]	0.00	0.	0.00	0.	0.	0.	278	0.02	0.01	0.01	35.
1.01	[illegible]2.3[illegible]	1[illegible]	0.00	0.	0.00	0.	0.	0.	279	0.02	0.01	0.01	35.
1.01	[illegible].4[illegible]	13[illegible]	0.00	0.	0.00	0.	0.	0.	280	0.02	0.01	0.01	35.
1.01	22.[illegible]	1[illegible]7	0.00	0.	0.00	0.	0.	0.	281	0.02	0.01	0.01	35.

1.01	23.1	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.	0.	283	0.02	0.01	0.01	35.
1.01	23.2[illegible]	1[illegible]	.00	[illegible]	.00	[illegible]	0.	0.	284	0.02	0.01	0.01	35.
1.01	23.3[illegible]	1[illegible]	.00	[illegible]	.00	[illegible]	0.	0.	285	0.02	0.01	0.01	35.
1.01	23.[illegible]	1[illegible]	.00	[illegible]	.00	[illegible]	0.	0.	286	0.02	0.01	0.01	35.
1.01	23.5[illegible]	14[illegible]	.00	[illegible]	.00	[illegible]	0.	0.	287	0.02	0.01	0.01	35.
1.02	0.	144	.00	[illegible]	.00	[illegible]	0.	0.	288	0.02	0.01	0.01	35.

SUM	20.31	17.68	2.63	54652.
	(516.)	(449.)	(67.)	(1547.57)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	466[illegible].	1315.	374.	190.	54610.
CMS	132.	37.	11.	5.	1546.
INCHES		15.29	17.40	17.64	17.64
MM		388.41	441.69	448.02	448.02
AC-FT		652.	742.	752.	752.
THOUS CU M		804.	915.	928.	928.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

1.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	4.	14.	24.	25.	22.	20.
2[illegible].	2[illegible].	19.	17.	19.	13.	13.	13.	12.	7.
2.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	1.	2.	4.	5.	5.	5.
5.	[illegible]	5.	5.	[illegible]	5.	5.	5.	5.	5.
5.	[illegible]	5.	5.	5.	5.	5.	5.	5.	5.
5.	[illegible]	5.	5.	5.	5.	5.	5.	5.	5.
[illegible]	2[illegible].	36.	42.	4[illegible].	43.	43.	43.	43.	43.
4[illegible].	4[illegible].	43.	43.	4[illegible].	43.	43.	43.	43.	43.
43.	4[illegible].	43.	42.	4[illegible].	43.	43.	43.	43.	43.
43.	4[illegible].	43.	42.	4[illegible].	43.	73.	155.	242.	280.
2[illegible]3.	2[illegible].	291.	[illegible]11.	33[illegible].	341.	342.	342.	353.	383.
415.	42[illegible].	439.	[illegible].	42[illegible].	446.	590.	1090.	1681.	1648.
1031.	55[illegible].	427.	[illegible].	401.	401.	390.	360.	328.	314.
313.	31[illegible].	275.	173.	6[illegible].	17.	12.	12.	12.	12.
12.	1[illegible].	12.	12.	12.	12.	12.	12.	12.	12.
12.	1[illegible].	12.	12.	12.	12.	12.	12.	12.	12.
12.	1[illegible].	12.	12.	12.	12.	12.	12.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1661.	473.	135.	68.	19659.
CMS	48.	13.	4.	2.	557.
INCHES		5.51	6.26	6.35	6.35
MM		139.83	159.08	161.29	161.29
AC-FT		235.	267.	271.	271.
THOUS CU M		290.	329.	334.	334.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

1.	1.	1.	1.	1.	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	[illegible]	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	[illegible]	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	[illegible]	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	[illegible]	[illegible]	0.	0.	0.	0.	0.

	[illegible]	[illegible]	[illegible]	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	20.	33.	35.	30.	28.
2[illegible].	2[illegible].	27.	24.	2[illegible].	19.	19.	19.	16.	10.
3.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	3.	3.	5.	6.	6.	6.
6.	[illegible]	6.	6.	[illegible]	6.	6.	6.	6.	6.
6.	[illegible]	6.	5.	[illegible]	6.	6.	6.	6.	6.
6.	[illegible]	[illegible]	[illegible]	[illegible]	6.	6.	6.	6.	6.
13.	[illegible]	50.	59.	6[illegible].	60.	60.	60.	60.	60.
60.	[illegible]	60.	50.	[illegible]	60.	60.	60.	60.	60.
60.	[illegible]	60.	50.	[illegible]	60.	60.	60.	60.	60.
60.	[illegible]	[illegible]	[illegible]	[illegible]	60.	101.	215.	336.	389.
373.	37[illegible].	40[illegible].	432.	[illegible]	474.	475.	475.	490.	532.
577.	57[illegible].	59[illegible].	[illegible]	591.	619.	819.	1513.	2334.	2289.
1432.	77[illegible].	593.	559.	55[illegible].	557.	542.	509.	455.	436.
424.	43[illegible].	368.	240.	[illegible]	23.	17.	17.	17.	17.
17.	17.	17.	17.	17.	17.	17.	17.	17.	17.
17.	17.	17.	17.	17.	17.	17.	17.	17.	17.
17.	17.	17.	17.	17.	17.	17.	17.		

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2324.	656.	187.	95.	27305.
CMS	66.	19.	5.	3.	773.
INCHES		7.65	8.70	8.82	8.82
MM		194.20	220.94	224.01	224.01
AC-FT		326.	371.	376.	376.
THOUS CU M		402.	458.	464.	464.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
1.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	11.	40.	67.	67.	60.	56.
55.	5[illegible].	53.	47.	4[illegible].	37.	37.	37.	33.	20.
0.	1.	1.	1.	[illegible]	1.	1.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	6.	11.	13.	13.	13.
13.	1[illegible].	13.	13.	13.	13.	13.	13.	13.	13.
13.	1[illegible].	13.	13.	13.	13.	13.	13.	13.	13.
13.	1[illegible].	13.	13.	13.	13.	13.	13.	13.	13.
20.	6[illegible].	101.	117.	11[illegible].	119.	119.	119.	119.	119.
11[illegible].	11[illegible].	112.	11[illegible].	11[illegible].	112.	119.	119.	119.	119.
11[illegible].	11[illegible].	119.	11[illegible].	11[illegible].	113.	119.	119.	119.	119.
11[illegible].	11[illegible].	112.	11[illegible].	11[illegible].	119.	202.	431.	673.	777.
747.	78[illegible].	307.	[illegible]	92[illegible].	948.	956.	950.	981.	1065.
1159.	119[illegible].	119[illegible].	117[illegible].	118[illegible].	1238.	1639.	3027.	4668.	4578.
2354.	154[illegible].	1167.	1119.	111[illegible].	1114.	1084.	999.	911.	872.
459.	66[illegible].	765.	[illegible]	177.	46.	35.	35.	35.	35.
35.	35.	35.	35.	3[illegible].	35.	35.	35.	35.	35.
35.	35.	35.	35.	3[illegible].	35.	35.	35.	35.	35.
[illegible]	35.	35.	3[illegible].	35.	35.	35.	35.		

PEAK 6-HOUR 24-HOUR 72-HOUR TOTAL VOLUME

[illegible]CFS	[illegible]	[illegible]47.	11.	5.	[illegible]
[illegible]CHES		15.2[illegible]	17.40	17.64	1546.
[illegible]		3[illegible]4.4[illegible]	441.8[illegible]	448.02	17.64
[illegible]C-FT		652.	742.	752.	448.02
T[illegible] CU M		804.	915.	926.	752.
					928.

****** ** ******** ** ********* ********** **********

HYD[illegible]GRAPH ROUTING

TE[illegible]GRAPH AT [illegible] NO BREACH

ISTAQ	I[illegible]MP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

[illegible]	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
[illegible]	0.	[illegible]	1	1	0	0		0

NSTPS	[illegible]TOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.	0.	0.	-1713.	-1

STAGE	1713.	171[illegible]	1717.[illegible]	1718.[illegible]	
FLOW	[illegible]	[illegible]	77[illegible]	1362.[illegible]	
CAPACITY=	0.	64.	[illegible]	93.	101.
ELEVATION=	[illegible]	1713.	1[illegible]	171[illegible]	1719.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1713.0	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1718.5	3.0	1.5	615.

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	1.	3.	7.	12.	15.	16.
17.	1[illegible]	14.	18.	17.	17.	16.	15.	15.	13.
11.	[illegible]	6.	5.	4.	3.	2.	2.	1.	1.
1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	1.	2.	3.	3.
[illegible]	4.	4.	4.	4.	4.	4.	4.	4.	4.
5.	[illegible]	5.	5.	5.	5.	5.	5.	5.	5.
5.	[illegible]	5.	5.	5.	5.	5.	5.	5.	5.
5.	[illegible]	13.	20.	25.	30.	34.	36.	38.	39.
[illegible]	41.	41.	42.	42.	42.	42.	42.	43.	43.
[illegible]	[illegible]	43.	43.	43.	43.	43.	43.	43.	43.
43.	[illegible]	43.	43.	[illegible]	43.	47.	64.	99.	[illegible]

					[illegible]	[illegible]	[illegible]	[illegible]	332.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	42[illegible].	46[illegible].	655.	1017.	1356.
134[illegible].	1[illegible]	752.	391.	[illegible]11.	402.	437.	406.	378.	353.
13[illegible].	[illegible]	32[illegible].	295.	[illegible]	196.	14[illegible].	114.	87.	68.
[illegible]	[illegible]	35.	29.	[illegible]	22.	19.	18.	16.	15.
1[illegible].	[illegible]	13.	13.	1[illegible].	13.	13.	13.	13.	13.
1[illegible].	[illegible]	12.	12.	1[illegible].	12.	12.	12.		

STORAGE

64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
5[illegible].	[illegible]	5[illegible].	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	6[illegible].	54.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	54.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	6[illegible].	54.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	6[illegible].	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	54.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	54.	[illegible]	64.	64.	64.	65.	65.
6[illegible].	[illegible]	65.	65.	[illegible]	65.	65.	65.	65.	65.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	54.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	54.	[illegible]	64.	64.	64.	64.	64.
6[illegible].	[illegible]	65.	55.	[illegible]	65.	65.	66.	66.	66.
66.	[illegible]	66.	56.	[illegible]	66.	66.	66.	66.	66.
66.	[illegible]	65.	56.	[illegible]	66.	66.	65.	66.	66.
66.	[illegible]	65.	56.	[illegible]	66.	66.	67.	68.	70.
7[illegible].	7[illegible].	74.	75.	7[illegible].	77.	78.	78.	79.	79.
[illegible]0.	[illegible]	81.	31.	[illegible]	62.	83.	87.	94.	101.
101.	[illegible]	8[illegible].	66.	[illegible]	82.	82.	81.	81.	80.
79.	[illegible]	7[illegible].	78.	75.	73.	71.	69.	68.	67.
6[illegible].	[illegible]	65.	65.	65.	65.	65.	65.	65.	65.
6[illegible].	[illegible]	65.	65.	[illegible]	64.	64.	64.	64.	64.
6[illegible].	[illegible]	64.	64.	[illegible]	64.	64.	64.		

STAGE

1713.0	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.[illegible]	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.	1713.0	1713.0	1713.[illegible]	1713.0	1713.1	1713.1	1713.1	1713.1
1713.1	1713.[illegible]	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1
1713.1	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.[illegible]	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.0	1713.	1713.0	1713.0	1713.[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0
1713.[illegible]	1713.[illegible]	1713.1	1713.1	1713.2	1713.2	1713.2	1713.3	1713.3	1713.3
1713.3	1713.[illegible]	1713.3	1713.3	1713.3	1713.3	1713.3	1713.3	1713.3	1713.3
1713.3	1713.[illegible]	1713.3	1713.3	1713.[illegible]	1713.3	1713.3	1713.3	1713.3	1713.3
1713.3	1713.[illegible]	1713.3	1713.3	171[illegible]	1713.3	1713.3	1713.5	1713.7	1714.0
1714.[illegible]	1714.[illegible]	1714.7	17[illegible].6	1715.[illegible]	1715.1	1715.2	1715.3	1715.4	1715.5
1715.[illegible]	1715.[illegible]	1715.7	1715.8	171[illegible]	1715.8	1716.0	1716.5	1717.6	1718.5
[illegible].5	1717.7	1716.9	[illegible].4	171[illegible].1	1715.9	1715.8	1715.7	1715.6	1715.6
[illegible].5	1715.[illegible]	1715.4	[illegible].2	[illegible]	1714.5	1714.1	1713.8	1713.7	[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1713.1	1713.1
1713.1	[illegible]	1713.1	1713.1	[illegible]	1713.1	1713.1	1713.1	1713.1	1713.1
1713.1	[illegible]	1713.1	[illegible]	1713.1	1713.1	1713.1	1713.1		

PEAK [illegible] IS 26, [illegible] TIME 40.00 [illegible]

	[illegible]	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	13[illegible].	460.	134.	68.	15618.
CMS	[illegible].	13.	4.	2.	556.
[illegible]		5.35	6.25	6.34	6.34
[illegible]		135.95	158.74	160.95	160.95
AC-FT		228.	267.	270.	270.
[illegible] CU M		282.	329.	333.	333.

STATION 1, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	[illegible]	0.	1.	1.	1.	1.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	1.	4.	10.	16.	20.	23.
2[illegible].	[illegible]	26.	25.	[illegible]	23.	22.	21.	20.	18.
1[illegible].	1[illegible].	9.	7.	[illegible]	4.	3.	2.	2.	1.
1.	1.	1.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	[illegible]	1.	1.	3.	4.	4.
5.	[illegible]	6.	6.	6.	6.	6.	6.	6.	6.
6.	[illegible]	5.	6.	6.	6.	6.	6.	6.	6.
6.	[illegible]	6.	6.	6.	6.	6.	6.	6.	6.
7.	11.	19.	28.	3[illegible].	42.	47.	50.	52.	54.
56.	57.	57.	58.	5[illegible].	59.	59.	59.	59.	59.
59.	5[illegible].	59.	59.	59.	59.	59.	59.	59.	59.
59.	5[illegible].	59.	59.	59.	59.	65.	89.	137.	195.
24[illegible].	2[illegible].	314.	344.	[illegible]	425.	447.	460.	470.	489.
518.	54[illegible].	570.	563.	56[illegible].	596.	651.	909.	1519.	2557.
1632.	1217.	935.	742.	66[illegible].	613.	585.	556.	521.	487.
46[illegible].	45[illegible].	432.	378.	305.	240.	184.	141.	109.	85.
[illegible]	[illegible]	45.	38.	32.	29.	26.	23.	22.	21.
20.	1[illegible].	19.	19.	1[illegible].	18.	18.	18.	17.	17.
17.	17.	17.	17.	17.	17.	17.	17.		

STORAGE

64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	65.	65.	65.
65.	[illegible]	65.	65.	[illegible]	65.	65.	65.	65.	65.
65.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
[illegible]	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
[illegible]	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

							[illegible]	[illegible]	[illegible]
65.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	[illegible]	64.	64.	64.	64.	64.
66.	[illegible]	65.	65.	66.	66.	66.	66.	66.	66.
6[illegible].	[illegible]	67.	67.	67.	67.	67.	67.	67.	67.
67.	[illegible]	67.	67.	67.	67.	67.	67.	67.	67.
67.	[illegible]	67.	67.	67.	67.	67.	68.	70.	73.
75.	77.	76.	80.	[illegible]	82.	82.	82.	83.	83.
8[illegible].	[illegible]	85.	85.	[illegible]	86.	87.	92.	102.	106.
10[illegible].	[illegible]	93.	85.	[illegible]	66.	85.	85.	84.	83.
8[illegible].	[illegible]	87.	80.	7[illegible].	75.	72.	70.	69.	68.
67.	[illegible]	66.	66.	65.	65.	65.	65.	65.	65.
65.	[illegible]	65.	65.	65.	65.	65.	65.	65.	65.
65.	[illegible]	65.	65.	65.	65.	65.	65.		

STAGE

1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1712.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.1	1713.1	1713.2	1713.2
1713.2	[illegible]	1713.2	1713.2	1713.2	1713.2	1713.2	1713.2	1713.1	1713.1
1713.1	[illegible]	1713.1	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.1	[illegible]	1713.1	1713.2	1713.3	1713.3	1713.3	1713.4	1713.4	1713.4
1713.4	[illegible]	1713.4	1713.4	1713.4	1713.4	1713.4	1713.4	1713.4	1713.4
1713.4	[illegible]	1713.4	1713.4	1713.4	1713.4	1713.4	1713.4	1713.4	1713.4
1713.4	[illegible]	1713.4	1713.4	1713.4	1713.4	1713.5	1713.7	1714.0	1714.5
1714.	[illegible]	1715.3	1715.5	1715.7	1715.8	1715.9	1715.9	1716.0	1716.0
1716.1	[illegible]	1716.3	1715.3	1716.4	1716.4	1716.6	1717.3	1718.6	1719.1
1718.7	[illegible]	1717.4	1715.9	1716.6	1716.5	1716.4	1716.3	1716.1	1716.0
1715.	[illegible]	1715.6	1715.6	1715.3	1714.8	1714.4	1714.0	1713.8	1713.6
1713.5	[illegible]	1713.3	1713.3	1713.2	1713.2	1713.2	1713.2	1713.2	1713.2
1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1
1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1		

PEAK OUTFL[illegible] IS 7, [illegible]T TI[illegible]E 40.00 [illegible]

	PEA[illegible]	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	25[illegible]7.	642.	187.	95.	27248.
CMS	72.	18.	5.	3.	772.
INCHES		7.46	8.68	8.80	8.80
MM		189.53	220.47	223.54	223.54
AC-FT		318.	370.	375.	375.
THOUS CU M		392.	457.	463.	463.

STATION 1, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	[illegible]	1.	1.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	0	0

			.	.	.	..	.	0.	0.
.	.	0.	0.	[illegible]	0.	0.	0.	0.	0.
.	.	0.	0.	[illegible]	0.	0.	0.	0.	0.
.	.	0.	0.	[illegible]	0.	0.	0.	0.	0.
.	.	0.	0.	[illegible]	0.	0.	0.	0.	0.
.	.	0.	0.	1.	8.	19.	32.	41.	45.
4.	.	51.	51.	49.	46.	44.	42.	40.	37.
[illegible]	.	18.	13.	10.	8.	6.	4.	3.	3.
[illegible]	.	1.	1.	1.	1.	1.	0.	0.	0.
.	.	0.	0.	0.	0.	0.	0.	0.	0.
.	.	0.	0.	[illegible]	1.	3.	5.	7.	9.
1[illegible]	.	11.	11.	12.	12.	12.	12.	12.	12.
1[illegible]	1[illegible]	13.	13.	13.	13.	13.	13.	13.	13.
1[illegible]	.	13.	13.	13.	13.	13.	13.	13.	13.
1[illegible]	[illegible]	37.	56.	72.	84.	93.	100.	105.	108.
11[illegible]	11[illegible]	115.	116.	117.	117.	118.	118.	118.	118.
11[illegible]	1[illegible]	119.	119.	119.	119.	119.	119.	119.	119.
11[illegible]	1[illegible]	119.	119.	117.	117.	130.	178.	274.	431.
[illegible]	[illegible]	731.	779.	[illegible]	894.	925.	939.	954.	991.
1[illegible]	11[illegible]	1157.	1177.	11[illegible]3.	1197.	1324.	2537.	4465.	4706.
323 .	1[illegible]	1333.	1241.	1[illegible]	1143.	1120.	1079.	1014.	948.
[illegible]	.	867.	732.	[illegible]51.	354.	265.	206.	161.	129.
10[illegible]	[illegible]	73.	62.	56.	50.	46.	43.	41.	39.
3[illegible]	[illegible]	36.	36.	36.	35.	35.	35.	35.	35.
3[illegible]	[illegible]	35.	35.	35.	35.	35.	35.		

STORAGE

64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
65.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	65.	65.	66.	66.
66.	[illegible]	66.	66.	66.	66.	66.	66.	66.	66.
65.	[illegible]	65.	65.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
[illegible]	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
64.	[illegible]	64.	64.	64.	64.	64.	64.	64.	64.
65.	[illegible]	66.	66.	67.	68.	68.	69.	69.	69.
67.	[illegible]	69.	69.	67.	69.	69.	69.	69.	69.
63.	[illegible]	69.	69.	69.	69.	69.	69.	69.	69.
67.	[illegible]	69.	69.	67.	69.	70.	72.	77.	82.
85.	[illegible]	89.	90.	91.	92.	93.	93.	93.	94.
73.	[illegible]	97.	97.	[illegible]	98.	100.	106.	111.	111.
10[illegible]	10[illegible]	101.	99.	97.	97.	96.	96.	94.	93.
92.	[illegible]	91.	89.	85.	80.	76.	73.	71.	70.
67.	[illegible]	67.	57.	66.	66.	66.	66.	66.	66.
6[illegible]	[illegible]	65.	56.	66.	66.	66.	66.	66.	66.
6[illegible]	[illegible]	65.	66.	66.	66.	66.	66.		

STAGE

1713.[illegible]	171[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.[illegible]	171[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	171[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.[illegible]	171[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.[illegible]	171[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	171[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
[illegible]3.	171[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
[illegible]13.	171[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0

1713.	[illegible]	1713.0	1713.0	1713.0	1713.1	1713.1	1713.2	1713.3	1713.3
1713.	[illegible]	1713.4	1713.4	1713.4	1713.3	1713.3	1713.3	1713.3	1713.3
1713.	[illegible]	1713.1	1713.1	1713.1	1713.1	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0
1713.	[illegible]	1713.0	1713.0	1713.0	1713.0	1713.0	1713.0	1713.1	1713.1
1713.1	[illegible]	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1
1713.1	[illegible]	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1
1713.1	[illegible]	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1	1713.1
1713.	[illegible]	1713.3	1713.4	1713.5	1713.6	1713.7	1713.7	1713.8	1713.8
1713.	[illegible]	1713.9	1713.9	1713.9	1713.9	1713.9	1713.9	1713.9	1713.9
1713.	[illegible]	1713.9	1713.9	1713.9	1713.9	1713.9	1713.9	1713.9	1713.9
1713.	[illegible]	1713.9	1713.9	1713.9	1713.9	1714.0	1714.3	1715.0	1715.8
1716.	[illegible]	1716.9	1717.0	1717.2	1717.3	1717.4	1717.4	1717.5	1717.6
1717.	[illegible]	1718.0	1718.0	1718.0	1718.1	1718.4	1719.1	1719.8	1719.8
1719.	[illegible]	1718.4	1718.2	1718.0	1717.9	1717.9	1717.8	1717.6	1717.4
1717.	[illegible]	1717.2	1716.9	1716.2	1715.6	1715.0	1714.5	1714.2	1714.0
1713.	[illegible]	1713.5	1713.5	1713.4	1713.4	1713.3	1713.3	1713.3	1713.3
1713.	[illegible]	1713.3	1713.3	1713.3	1713.3	1713.3	1713.3	1713.3	1713.3
1713.	[illegible]	1713.3	1713.3	1713.3	1713.3	1713.3	1713.3		

PEAK OUTFLOW IS 66. AT TIME 40.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	47[illegible].	1295.	373.	189.	54494.
CMS	13.	37.	11.	5.	1543.
INCHES		15.00	17.36	17.60	17.60
MM		382.64	440.92	447.07	447.07
AC-FT		542.	740.	751.	751.
THOUS CU M		792.	913.	926.	926.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTING THRU THE DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
50	1	0	0	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.	0.	0.	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.	0.	0.	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
[illegible]	0.	0.[illegible]	1682.0	172[illegible]	50.	0.73000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0. [illegible] .00 [illegible] 1635.00 [illegible] 1665.[illegible] 270.00 1682.00 285.00 1682.00

265.00 [illegible] .00 [illegible] 1635.00 [illegible] 1720.00

STORAGE	0.	0.13	0.17	0.45	0.82	1.24	1.74	2.31	2.95	[illegible]
	4.	5.99	[illegible]	7.20	8.26	9.37	10.59	11.86	13.20	14.[illegible]
OUTFLOW	[illegible]	1[illegible].72	516[illegible]	25925.[illegible]	46214.28	83569.43	133418.67	196837.90	[illegible]	[illegible]

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.36	RATIO 2 0.50	RATIO 3 1.00
HYDROGRAPH AT		0.80 (0.30E 19)	1	1681. (47.59)(	2334. 66.09)(	4668. 132.19)(
ROUTED TO		0.80 (0.30E 19)	1	1356. (38.41)(	2557. 72.40)(	4706. 133.25)(
ROUTED TO		0.80 (0.30E 19)	1	1356. (38.40)(	2554. 72.32)(	4709. 133.33)(
ROUTED TO		0.80 (0.23E 19)	1	1364. (38.61)(	2474. 70.07)(	4774. 135.20)(
ROUTED TO		0.80 (0.42E 18)	1	1378. (39.02)(	2387. 67.61)(	4835. 136.91)(
ROUTED TO		0.80 (0.61E 18)	1	1391. (39.38)(	2180. 61.74)(	4886. 138.37)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1713.00	1713.00	1718.50
STORAGE	64.	64.	101.
OUTFLOW	0.	0.	1362.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.36	1718.49	0.	101.	1356.	0.	40.00	0.
0.50	1719.14	0.64	106.	2557.	0.50	40.00	0.
1.00	1719.83	1.33	111.	4706.	0.83	40.00	0.

PLAN 1 STATION 50

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS	
0.36	1356.	1684.2	40.00	3.2
0.50	2554.	1684.7	40.00	3.7
1.00	4709.	1685.8	40.00	3.8

PLAN 1 STATION 1000

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS	
0.36	1364.	1621.5	40.17	4.5
0.50	2474.	1622.7	40.00	5.7
1.00	4774.	1624.7	40.00	7.7

PLAN 1 STATION 2000

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS	
0.36	1376.	1519.6	40.17	4.6
0.50	2387.	1520.5	40.00	5.5
1.00	4835.	1522.7	40.00	7.7

PLAN 1 STATION 3000

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS	
0.36	1391.	1475.5	40.17	5.5
0.50	2180.	1476.2	40.00	6.2
1.00	4886.	1478.0	40.00	8.0

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**********                                                    **********
FLOOD HYDROGRAPH PACKAGE (HEC-1)                              NEW YORK STATE
DAM SAFETY VERSION     JULY 1978                              DEPT OF ENVIRONMENTAL CONSERVATION
  LAST MODIFICATION  26 FEB 79                                FLOOD PROTECTION BUREAU
  MODIFIED FOR HONEYWELL APR 79
**********                                                    **********
    1              A1 ROXBURY DAM
    2              A PMF WITH RATIOS = ANALYSIS
    3              A3 DATE
    4              B   200       0      10       0       0       0       0       0       0       0
    5              B1    5
    6              J     1       3       1
    7              J1  .37      .5     I.0
    8              K     0       1                                               1
    9              K1                                  INFLOW HYDROGRAPH
   10              M     1       0.     .8                      .69                     1
   11              P     0      23     100     111     119     128
   12              T                                                       1     .06
   13              V    .5      .1
   14              X     2       1     3.5
   15              K     1       1                                               1
   16              K1 ROUTED HYDROGRAPH AT DAM [redacted] BREACH
   17              Y                                   1       1
   18              Y1    1                                                 -1713    -1
   19              Y4 1713  1715.5    1717  1718.5
   20              Y5    0     336     774    1362
   21              $S    0    63.9    79.5    93.4     101
   22              $E 1680    1713  1715.5  1717.5  1718.5
   23              $$ 1713
   24              $D1718.5     3.0     I.5     615
   25              $8   30      .5    1690       1    1713  1718.5
   26              K     1      50
   27              K1 LOCATION  TOE OF DAM
   28              Y                                   1       1
   29              Y1    1
   30              Y6  .05     .05     .05    1682    1720      50     .79
   31              Y7    0    1720     225    1685     270    1685     270    1682     285    1682
```

```
K      1    1000
K1 LOCATION HILLSIDE
Y                                  1      1
Y1     1
Y6   .05     .05     .05    1617    1660    1000    .065
Y7     0    1660      30    1640     110    1620     115    1617     125    1617
Y7   130    1620     190    1640     220    1660
K      1    2000
K1 LOCATION ROAD CROSSING
Y                                  1      1
Y1     1
Y6   .05     .05     .05    1515    1600    1000     .10
Y7     0    1600     400    1560     780    1520     780    1515     795    1515
Y7   795    1520    1000    1540    1200    1600
K      1    3000
K1 LOCATION JUNCTION WITH EAST BRANCH OF DELAWARE
Y                                  1      1
Y1     1
Y6   .05     .05     .05    1470    1520    1000     .04
Y7     0    1520      50    1500    1050    1475    1050    1470    1065    1470
Y7  1065    1475    2000    1500    2150    1520
K     99
A
A
A
A
A
```

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0,37	RATIO 2 0,50	RATIO 3 1,00
HYDROGRAPH AT	1	0,80 (0,30E 19)	1	1727, (48,91)(	2334, 66,09)(	4668, 132,19)(
ROUTED TO	1	0,80 (0,30E 19)	1	2040, (57,78)(	2937, 83,17)(	5066, 143,44)(
ROUTED TO	50	0,80 (0,30E 19)	1	2042, (57,83)(	2939, 83,23)(	5068, 143,52)(
ROUTED TO	1000	0,80 (0,23E 18)	1	2071, (58,65)(	2970, 84,10)(	5131, 145,28)(
ROUTED TO	2000	0,80 (0,42E 18)	1	2087, (59,11)(	2986, 84,56)(	5183, 146,76)(
ROUTED TO	3000	0,80 (0,61E 18)	1	2077, (58,83)(	2956, 83,72)(	5231, 148,12)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1713.00	1713.00	1718.50
STORAGE	64.	64.	101.
OUTFLOW	0.	0.	1362.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.37	1718.61	0.11	102.	2101.	0.25	40.46	40.00
0.50	1718.90	0.40	104.	2976.	0.35	40.13	39.83
1.00	1719.41	0.91	108.	5209.	0.54	40.08	39.67

PLAN 1 STATION 50

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS	
0.37	2042.	1684.5	40.33	2.5
0.50	2939.	1684.9	40.17	2.9
1.00	5068.	1685.9	40.00	3.9

PLAN 1 STATION 1000

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS	
0.37	2071.	1622.3	40.33	5.3
0.50	2970.	1623.3	40.17	6.3
1.00	5131.	1624.9	40.00	7.7

PLAN 1 STATION 2000

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS	
0.37	2087.	1520.2	40.33	5.2
0.50	2986.	1521.1	40.17	6.1
1.00	5183.	1523.1	40.00	8.1

PLAN 1 STATION 3000

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS	
0.37	2077.	1476.1	40.33	6.1
0.50	2956.	1476.7	40.17	6.7
1.00	5231.	1478.1	40.00	8.1

APPENDIX D

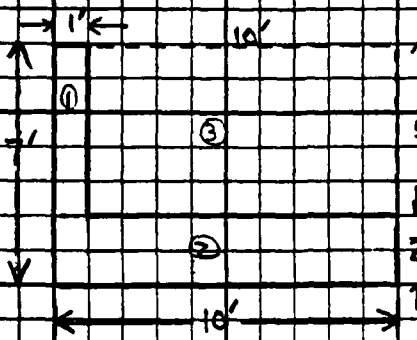
STABILITY COMPUTATIONS

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
ROXBURY DAM	1		
SUBJECT		**COMPUTED BY**	**DATE**
STRUCTURAL STABILITY ANALYSIS		RLW	2/27/80



ADD VOLUME ON TO ACCOUNT FOR ABUTMENT AND PIERS

VOLUME OF WEST ABUTMENT $(8)(10.5)(10) = 840\ ft^3$

VOLUME OF EAST ABUTMENT $(3.5)(10.5)(12) = 441\ ft^3$

VOLUME OF PIERS $(4)(2)(10)(5) = 400\ ft^3$

$1681\ ft^3$

DIVIDE THIS BY WIDTH OF FRONT SLAB

$\frac{1681\ ft^3}{34\ ft} = 49.4\ ft^3/ft$ ADD THIS TO THE SECTION ANALYZED

AREAS CAN BE COMBINED AND TAKEN AS 1 AREA

AREA = ① + ② + ③ = $(1)(9) + (2)(10) + (5)(10) = 75\ ft^2$

DISTANCE FROM CENTROID TO DOWNSTREAM TOE = 5'

INPUT TO STABILITY ANALYSIS PROGRAM

INPUT ENTRY	PROGRAM No.
Unit Weight of Dam (K/ft^3)	0
Area of Segment No. 1 (ft^2)	1
Distance from Center of Gravity of Segment No. 1 to Downstream Toe (ft)	2
Area of Segment No. 2 (ft^2)	3
Distance from Center of Gravity of Segment No. 2 to Downstream Toe (ft)	4
Area of Segment No. 3 (ft^2)	5
Distance from Center of Gravity of Segment No. 3 to Downstream Tow (ft)	6
Base Width of Dam (Total) (ft)	7
Height of Dam (ft)	8
Ice Loading (K/L ft.)	9
Coefficient of Sliding	10
Unit Weight of Soil (K/ft^3)	11
Active Soil Coefficient - Ka	12
Passive Soil Coefficient - Kp	13
Height of Water over Top of Dam or Spillway (ft)	14
Height of Soil for Active Pressure (ft)	15
Height of Soil for Passive Pressure (ft)	16
Height of Water in Tailrace Channel (ft)	17
Weight of Water (K/ft^3)	18
Area of Segment No. 4 (ft^2)	19
Distance from Center of Gravity of Segment No. 4 to Downstream Toe (ft)	20
Height of Ice Load or Active Water (ft)	46

Normal Conditions

0.15	RCL 1
75.	
75.	RCL 2
5.	
5.	RCL 3
0.	
0.	RCL 4
0.	
0.	RCL 7
11.	
11.	RCL 8
7.	
7.	RCL 9
0.	
0.	RCL 10
0.5	
0.5	RCL 11
0.055	
0.055	RCL 14
0.	
0.	RCL 18
0.0624	
0.0624	RCL 46
7.	

Ice Load of 5ksf

0.15	RCL 1
75.	
75.	RCL 2
5.	
5.	RCL 3
0.	
0.	RCL 4
0.	
0.	RCL 7
11.	
11.	RCL 8
7.	
7.	RCL 9
5.	
5.	RCL 10
0.5	
0.5	RCL 11
0.055	
0.055	RCL 14
0.	
0.	RCL 18
0.0624	
0.0624	RCL 46
7.	

2.655205619 —— F.S. vs. Overturning — 1.001160458

3.96324427 .0073692301

2.893642072 —— F.S. vs. Sliding —— .6775824041

WATER SURFACE AT TOP OF DAM

0.15	RCL 1
75.	
75.	RCL 2
5.	
5.	RCL 3
0.	
0.	RCL 4
0.	
0.	RCL 7
11.	
11.	RCL 8
7.	
7.	RCL 9
0.	
0.	RCL 10
0.5	
0.5	RCL 11
0.055	
0.055	RCL 14
5.5	
5.5	RCL 18
0.0624	
0.0624	RCL 46
7.	

1.900774502 ——— F.S. vs. OVERTURNING

3.01288485

1.12500585 ——— F.S. vs. SLIDING

SEISMIC STUDY

0.15	RCL 1
75.	
75.	RCL 2
5.	
5.	RCL 3
0.	
0.	RCL 4
0.	
0.	RCL 7
11.	
11.	RCL 8
7.	
7.	RCL 9
0.	
0.	RCL 10
0.5	
0.5	RCL 11
0.055	
0.055	RCL 14
0.	
0.	RCL 18
0.0624	
0.0624	RCL 46
7.	
7.	RCL 50
0.1	

NORMAL

2.655205619

3.96324427

2.893642072

SEISMIC

2.061609165

3.273824314

1.566867611

APPENDIX E

REFERENCES

APPENDIX E

REFERENCES

1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.

2) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

3) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

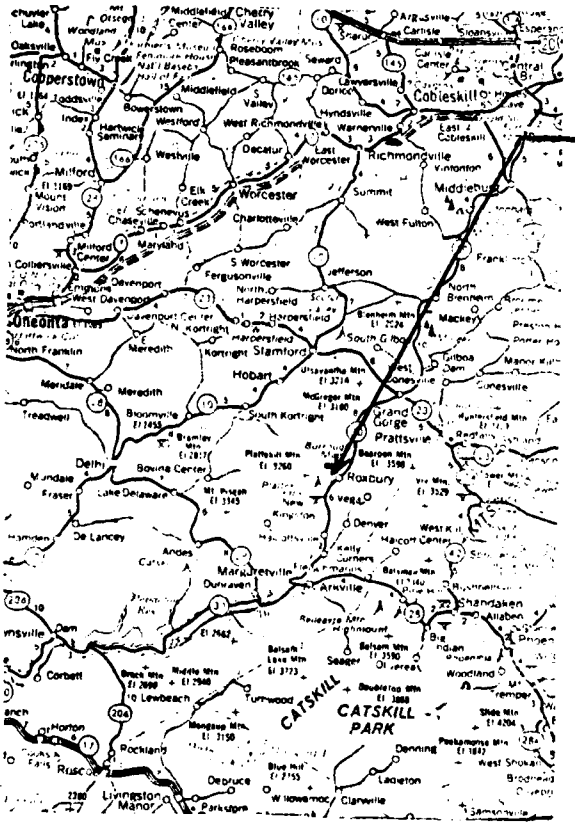
4) Elwyn E. Seelye, Design, 3rd edition, John Wiley and Sons, Inc., 1960

5) U.S. Department of the Interior, Bureau of Reclamation; Design of Small Dams, 2nd edition (rev. reprint), 1977.

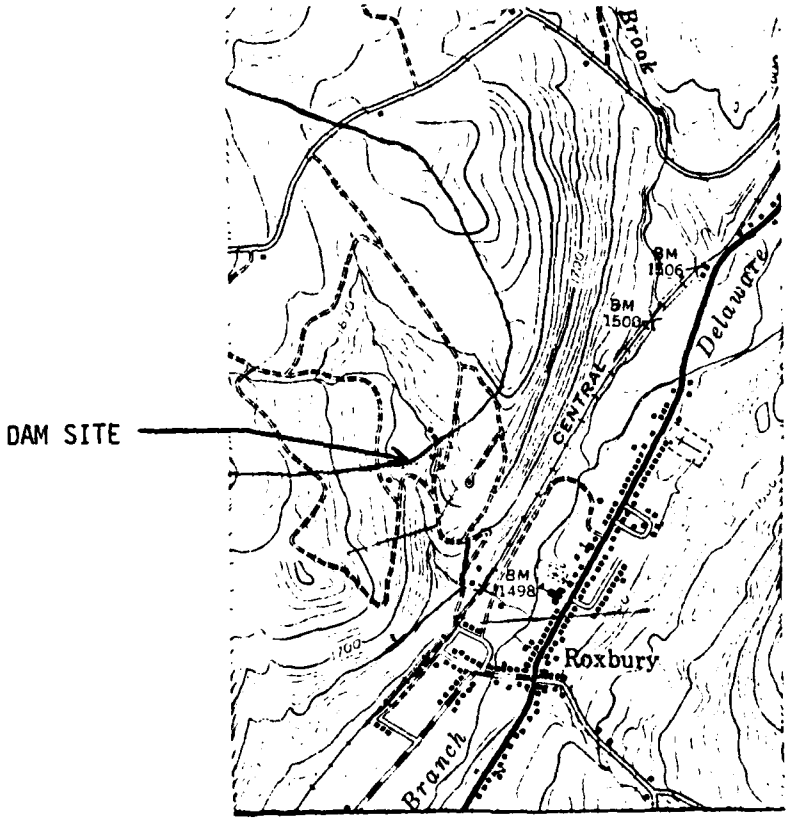
6) U.S. Army, Corps of Engineers, Upper Delaware River Basin Hydrologic Flood Routing Model, October, 1976

APPENDIX F

DRAWINGS



VICINITY MAP
ROXBURY DAM
I.D. No. NY 788



TOPOGRAPHIC MAP
ROXBURY DAM
I.D. No. NY 788

413-76-121

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
MS ALBANY, NEW YORK 12201

FOR DEPARTMENT USE ONLY
Application No. 413-16-0082
Dam No. 646
Watershed Delaware Bas.

APPLICATION FOR PERMIT

for the Construction, Reconstruction or Repair of a Dam or Other Impoundment Structure under Conservation Law, Section 429 (c).

d instructions on the reverse side before completing this application. Please type or print clearly in ink.

1. NAME AND ADDRESS OF APPLICANT
First Name: Chantex Corporation | M.I. | Last Name | Phone No. 212 752 - 5220
Street Address: 850 3rd. Ave.
Post Office: New York City | State: N.Y. | Zip Code: 10000

2. NAME AND ADDRESS OF OWNER (If different from applicant)
First Name: Chantex Corporation | M.I. | Last Name
Street Address: 850 3rd. Ave.
Post Office: New York City | State: N.Y. | Zip Code: 10000

YPE OF PROJECT: ☐ Construction ☒ Reconstruction ☐ Repair

4. IS STATE-OWNED LAND TO BE USED? ☐ Yes ☒ No

5. PROPOSED STARTING DATE: July 1, 1976

EXPECTED COMPLETION DATE: July 30, 1977

JECT DESCRIPTION

OCATION OF DAM
Stream or Body of Water: unnamed tributary of the Trahon of Delaware R. | County: Delaware | Town: Roxbury | Give distance and direction from commonly accepted landmark: N.25 ± 3000' from intersection of NYS Rte. 30 & Co.Rte. 41 in Roxbury NY

OCATION ON U.S. GEOLOGICAL SURVEY MAP
Name of Map: xbury | Latitude: 42°-17'-2[illegible]" | Longitude: 74°-34'-14"

8. PROPOSED USE FOR IMPOUNDED WATER: Recreation

9. STATE THE HEIGHT ABOVE SPILLCREST OF THE LOWEST PART OF THE IMMEDIATE UPSTREAM ADJOINING PROPERTY OR PROPERTIES: Unknown Feet

S THIS PROPOSED POND OR LAKE PART OF A PUBLIC WATER SUPPLY? ☐ Yes ☒ No
f not, where is nearest downstream public water supply intake? Margaretville, or Roxbury

11. SIZE OF AREA DRAINING INTO POND OR LAKE (Acres or Square Miles): 490 Acres

HE DRAINAGE AREA IS COMPOSED OF: (Total = 100%)
30 % Forest | 40 % Cropland | ____ % Pasture | 30 Golf Course % Other | ____ % Swamp | ____ % Suburban Lands | ____ % Urban Lands

YPE OF SPILLWAY
☒ Service Spillway — Auxiliary Spillway Combination
☐ Single Spillway
☐ Pipe Riser ONLY
☐ Other ____

14. DESIGNER'S ESTIMATE OF CLASS OF HAZARD (As described in "Guidelines for Small Earth Dam Designs")
☐ Class "a" ☐ Class "b" ☒ Class "c"
NOTE: Provide descriptive information on character of downstream area.

SPILLWAY INFLOW DESIGN FLOOD CDF=70
Frequency 100yr Flood Peak 670 c.f.s. Runoff Volume 6"/24hr.

15b. SERVICE SPILLWAY INFLOW DESIGN FLOOD CDF=70
Frequency 10yr Flood Peak 360 c.f.s. Runoff Volume 4.4"/24hr.

HE SINGLE SPILLWAY OR AUXILIARY SPILLWAY IS COMPOSED OF:
☒ Vegated Earth ☐ Concrete ☐ Timber ☐ Rock-filled Crib ☒ Masonry ☐ Other ____

AXIMUM VELOCITY WITHIN THE SINGLE R AUXILIARY SPILLWAY 7 f.p.s.

18. SINGLE OR AUXILIARY SPILLWAY DISCHARGE AT DESIGN HIGH WATER 154 c.f.s.

19. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY ☐ Hydraulic Jump Basin ☐ Drop Structure ☐ Other NA

OND OR LAKE WILL BE DRAINED BY MEANS OF 12 inch ± existing Pipe thru Dam

WATER WILL BE SUPPLIED TO RIPARIAN OWNERS DOWNSTREAM BY MEANS OF Concrete Spillway

HEIGHT OF DAM ABOVE STREAM BED: 35.5 Feet

REA-CAPACITY DATA nswer 1, 2 and 3, OR 1, 2, 4, 5	ELEVATION, Referred To Assumed Benchmark	SURFACE AREA	VOLUME STORED
. Top of Dam	1718.5 Feet	7.8 Acres	101.0 Acre-Feet
. Design High Water	1717.5 Feet	7.5 Acres	93.4 Acre-Feet
. Single Spillway Crest	____ Feet	____ Acres	____ Acre-Feet
. Auxiliary Spillway Crest	1715.5 Feet	7.0 Acres	79.5 Acre-Feet
. Service Spillway Crest	1713.0 Feet	5.8 Acres	63.9 Acre-Feet

YPE OF ENERGY DISSIPATER AT OUTLET OF CONDUIT: ☐ Impact Basin ☐ Plunge Pool ☐ Hydraulic Jump Basin ☐ Other NA

IS PIPE RISER PROVIDED WITH AN ANTI-VORTEX DEVICE? ☐ Yes ☐ No NA

RAWDOWN TIMES: Answer 1 and 2, or 1, 3 and 4

Has provision been made to evacuate 90% of the storage below the lowest spillway crest within fourteen days? ☒ Yes ☐ No

Can the single spillway evacuate 75% of the storage between the maximum design high water and the spillway crest within 48 hours? ☐ Yes ☐ No

Can the Service Spillway evacuate 75% of the storage between the auxiliary spillway and the Service Spillway crests within seven days? ☒ Yes ☐ No

Can the Service Spillway and the Auxiliary Spillway in combination evacuate the storage between the design high water and the auxiliary spillway crest within 12 hours? ☒ Yes ☐ No

24. SOIL DATA — State the character of the bed and banks in respect to natural types of soil materials, hardness, perviousness, water bearing, effect of exposure to air and water, uniformity, etc.

NA

If an earth dam, describe the material to be used in the embankment.

NA

What is the source of embankment fill material(s)?

NA

Are there porous seams or fissures beneath the foundation of the proposed dam? ☐ Yes ☒ No | Method used to obtain the above soil data ☐ Soil Borings ☐ Test Pits NA

25. DESIGN ENGINEER		26. CONSTRUCTION ENGINEER OR CONTRACTOR	
Name of Agency or Individual	P.E. License No. of Individual	Name of Agency or Individual	P.E. License No. of Individual
Richard P. Buck, P.E.	# 45665	Richard P. Buck, P.E.	#45665
Address		Address	
Box 258A, RD #1, Deposit, N.Y. 13754		Box 258A RD #1, Deposit, N.Y. 13754	
Title		Title	
Consulting Engineer		Consulting Engineer	

27. NAME AND ADDRESS OF OFFICIAL NEWSPAPER OF LOCALITY WHERE PROPOSED WORKS ARE LOCATED

Catskill Mountain News, Margaretville, New York 12455

CERTIFICATION

28. Application is hereby made to the Department of Environmental Conservation pursuant to Section 429(c) of the Conservation Law.

The applicant certifies that the above statements are true and agrees that the issuance of the permit is based on the accuracy thereof. As a condition to the issuance of a permit, the applicant accepts full legal responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.

June 21, 1976
Date

Richard P Buck
Signature

INSTRUCTIONS

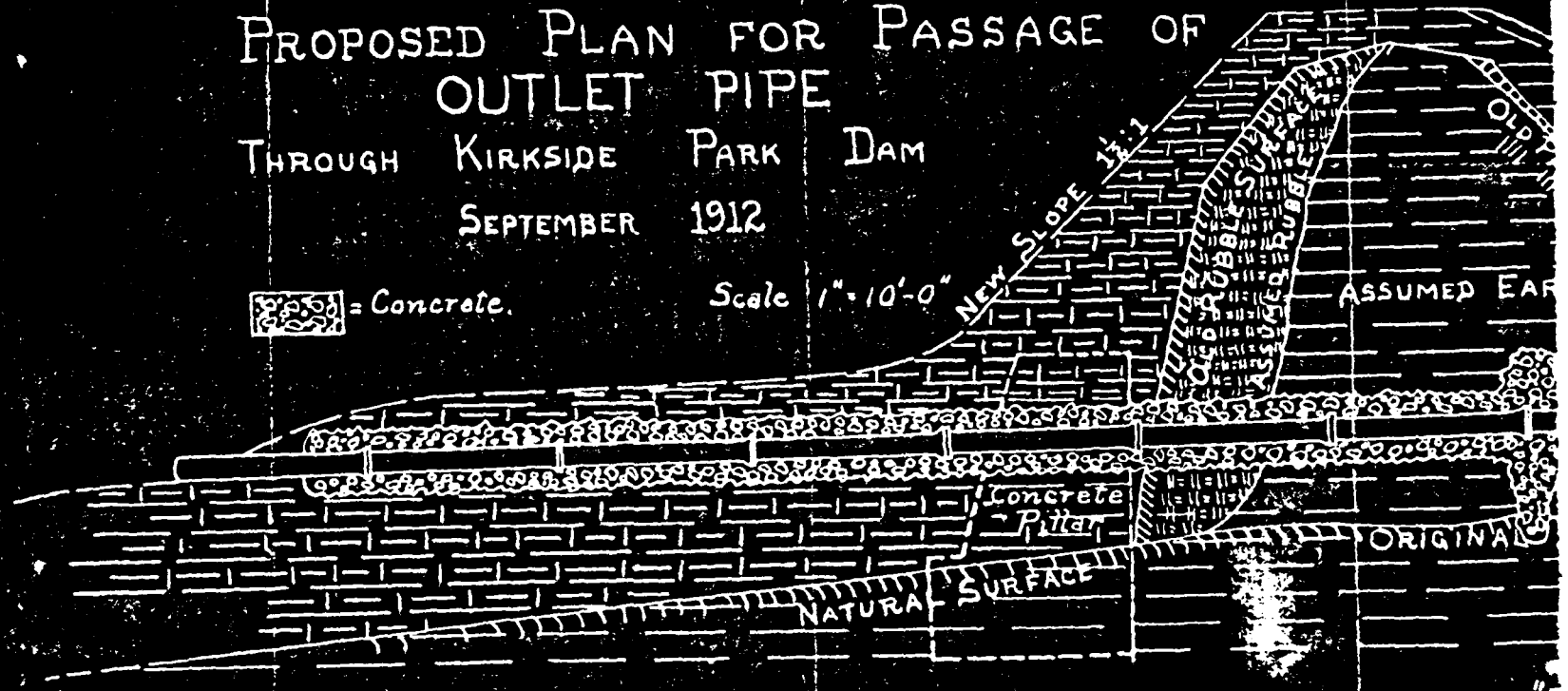
1. Type or print in INK.
2. Five (5) copies of all papers including detail construction plans and specifications must be filed.
3. The plans and specifications submitted with the application must include the following information:
   (a) A plan showing proposed dam, dam appurtenances, bench marks, topographic contours at dam and around the anticipated reservoir area, including 2-foot contours to 6 feet above high water level.
   (b) A profile along the dam axis and a transverse section of the dam at its maximum height.
   (c) A profile along the center line and transverse section, or sections, of the spillways including stilling basins, outlet work, and other details, if necessary, in design of the structures.
   (d) A topographical plan to a suitable scale showing drainage area, normal water level in the lake or pond and owners property line metes and bounds.
   (e) Specifications for materials and methods of construction.
   (f) A log of all soil information available to the design engineer or conservationist and location of drill holes, test pits or other foundation exploration, location of borrow area, horizontal and vertical controls, if necessary.
   (g) Additional drawings should be included to clearly show all details of the proposed works.
4. NO WORK of construction, reconstruction or repairs of the structure or structures SHALL BE STARTED UNTIL A PERMIT therefor has been issued by the New York State Department of Environmental Conservation.
5. The design, preparation of plans, estimates and specifications and the supervision of the erection, reconstruction and repair of all the structures herein applied for shall be done by a licensed professional engineer, or in the case of farm ponds by an engineer or conservationist employed by a governmental agency cooperating with a soil conservation district, or by an engineer employed by the Department of Environmental Conservation.
6. A "Notice of Application" must be published by the applicant. The form of notice and instructions for publication will be furnished to the applicant by the Local Permit Agent to whom the application is delivered.
7. An information circular "Guidelines for Small Earth Dam Designs" is available upon request from the Department of Environmental Conservation or the Local Permit Agent.
8. Samples of foundation, embankment and construction material need not be furnished unless requested.

PROPOSED PLAN FOR PASSAGE OF OUTLET PIPE THROUGH KIRKSIDE PARK DAM

SEPTEMBER 1912

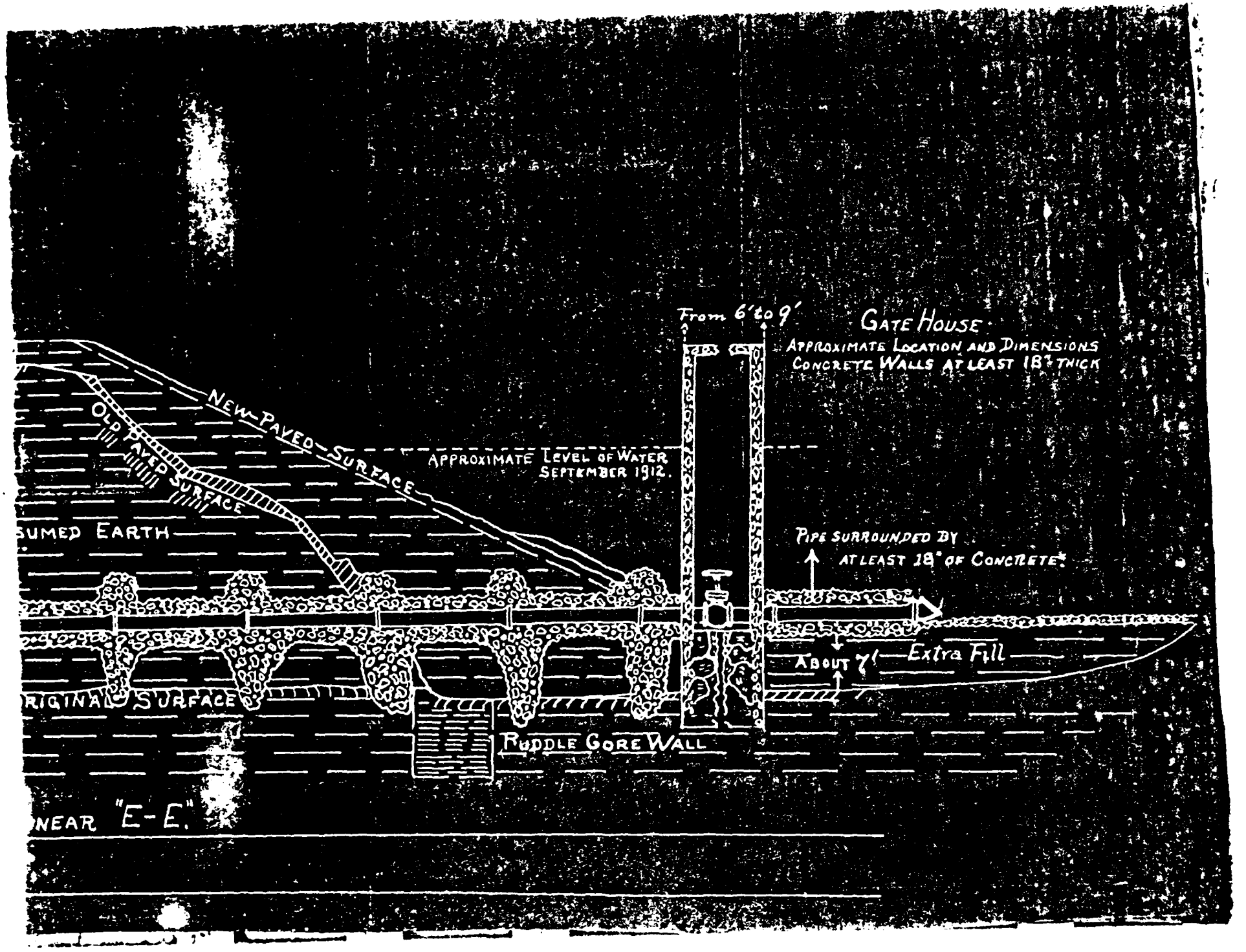
= Concrete.

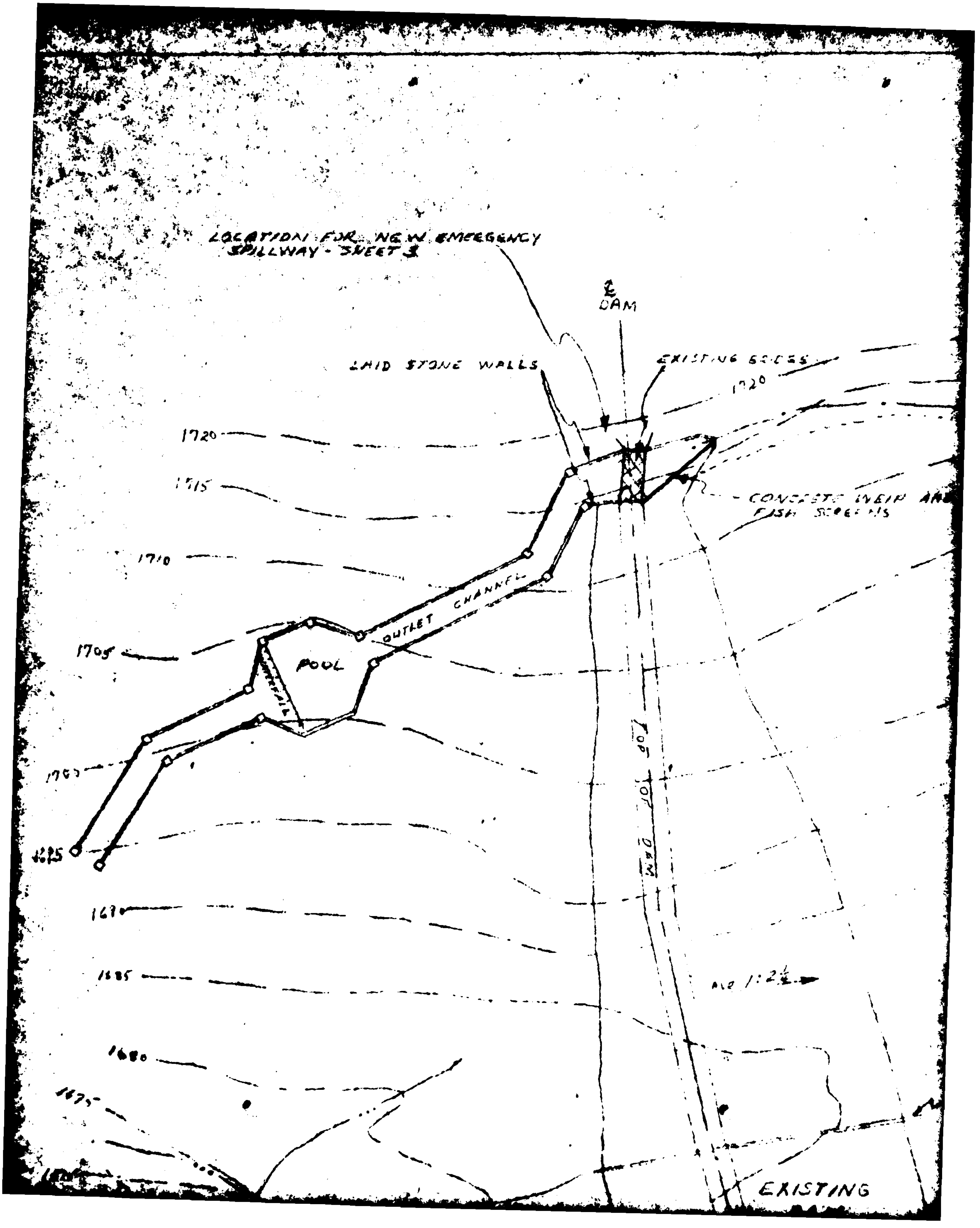
Scale 1" = 10'-0"



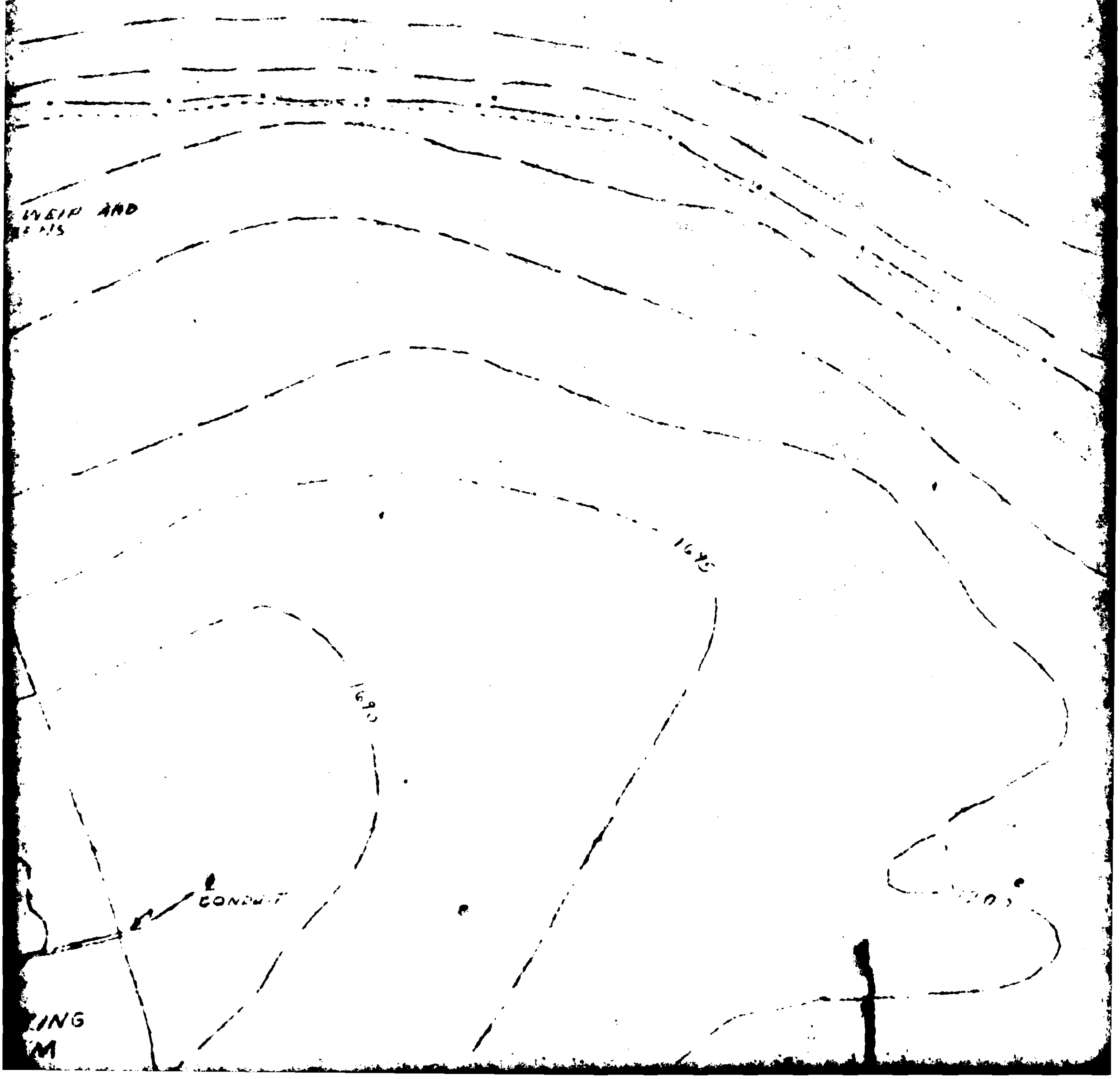
SECTION NEAR "B

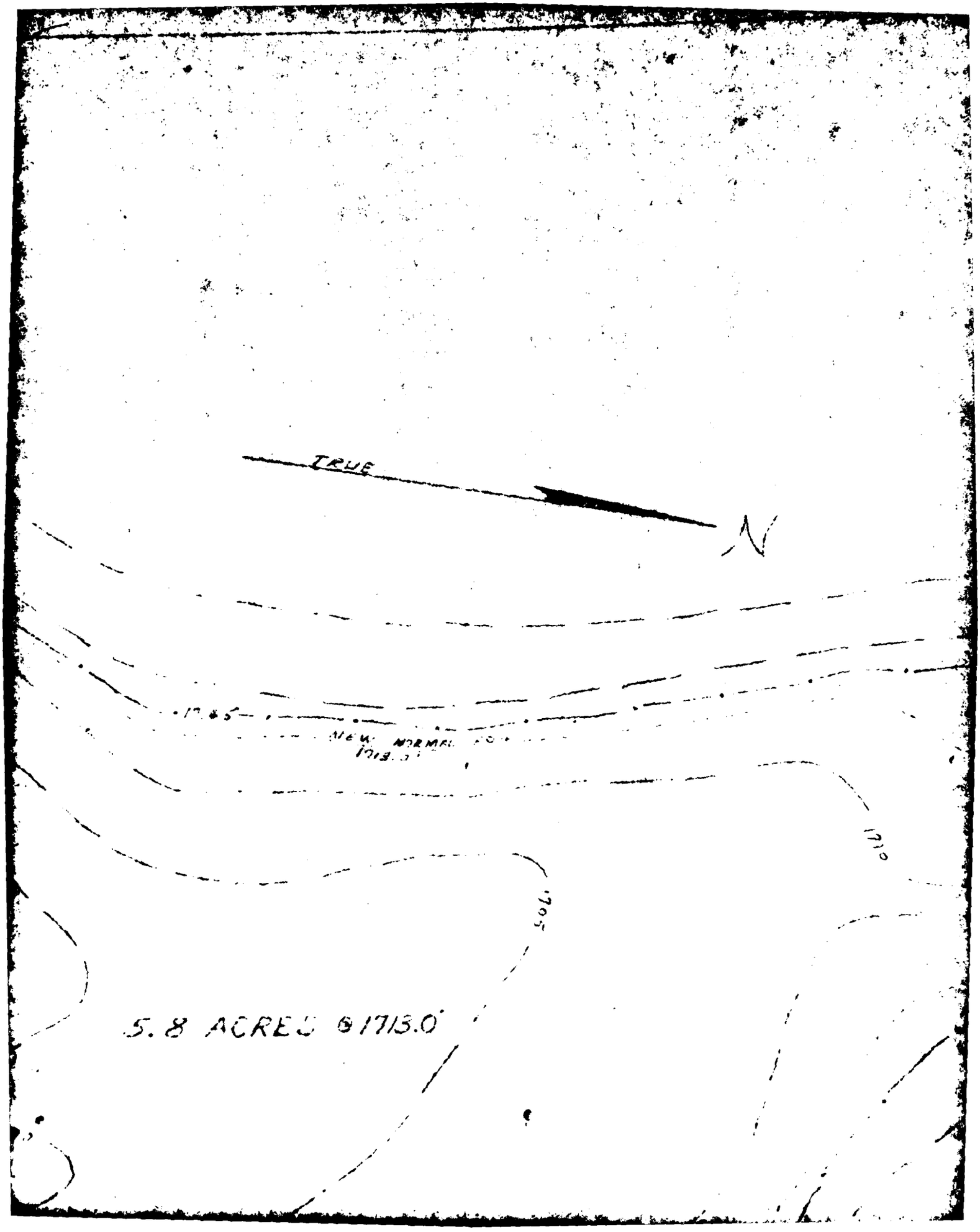
SECTION "D-D."

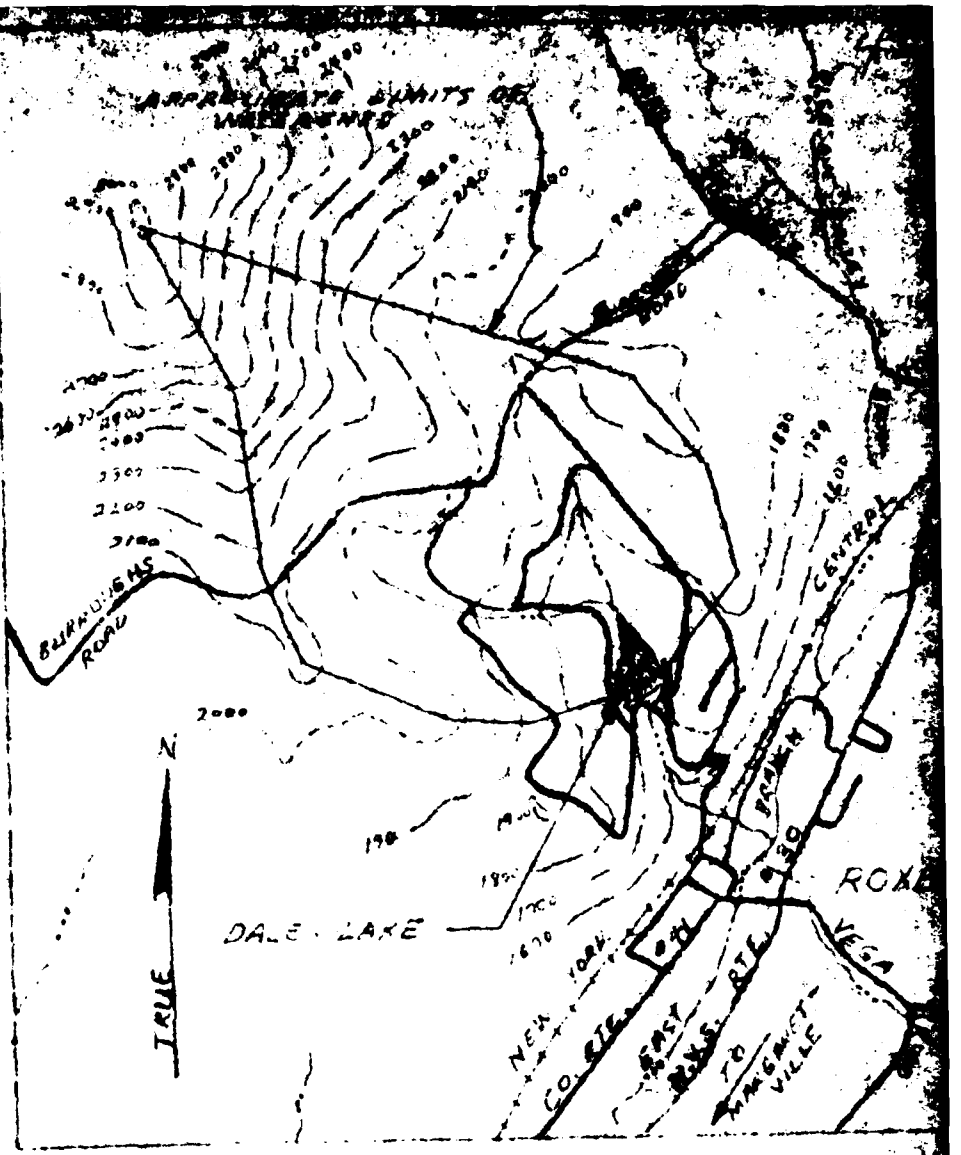

From 6' to 9'
GATE HOUSE
APPROXIMATE LOCATION AND DIMENSIONS
CONCRETE WALLS AT LEAST 18" THICK
NEW PAVED SURFACE
OLD PAVED SURFACE
APPROXIMATE LEVEL OF WATER SEPTEMBER 1912.
SUMED EARTH
PIPE SURROUNDED BY AT LEAST 18" OF CONCRETE
ABOUT 7' Extra Fill
RIGINAL SURFACE
PUDDLE CORE WALL
NEAR "E-E."



LOCATION FOR NEW EMERGENCY SPILLWAY - SHEET 3
℄ DAM
LAID STONE WALLS
EXISTING GRADES
1720
1720
1715
1710
1705
1700
1695
1690
1685
1680
1675
OUTLET CHANNEL
POOL
CONCRETE WEIR AND FISH SCREENS
TOP OF DAM
1:2½
EXISTING


WEIR AND
1695
1690
CONDUIT
ING
M

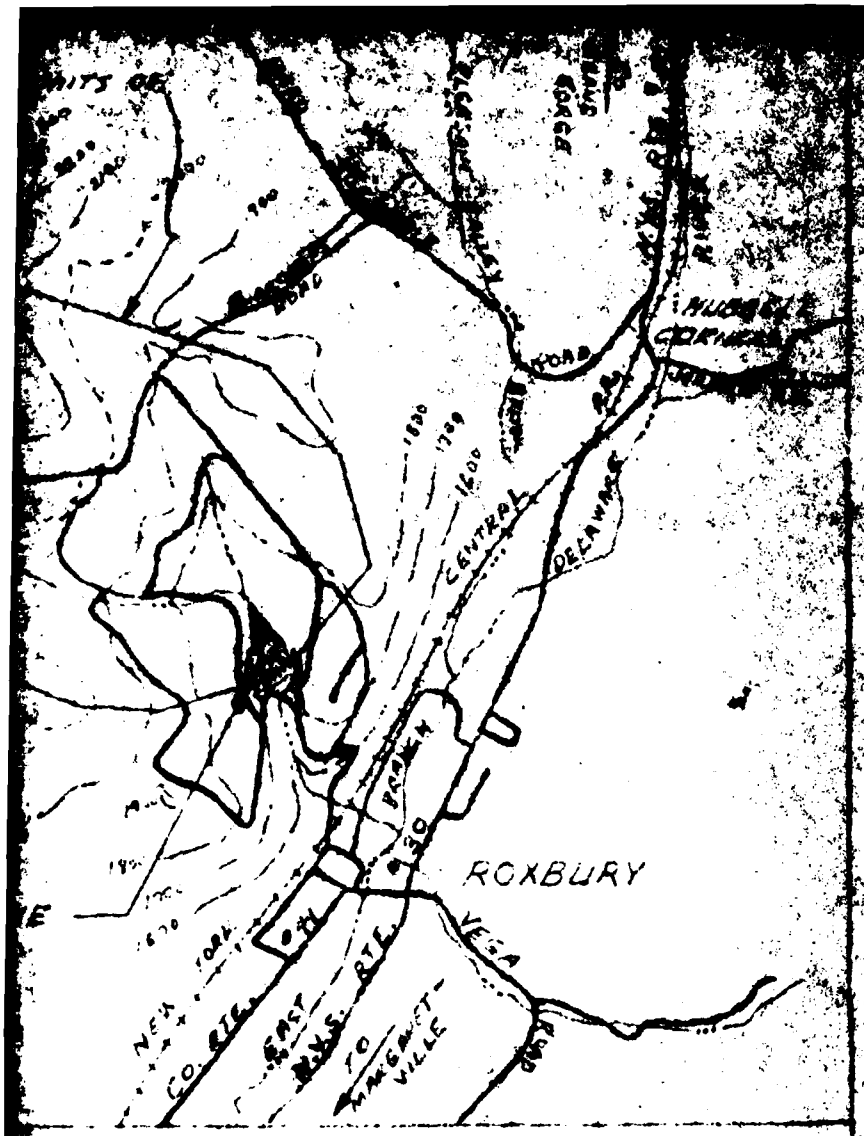

TRUE
N
1705
NEW NORMAL POOL
1713.0'
1710
1705
5.8 ACRES @ 1713.0'



LOCATION MAP

SCALE: 1" = 2000'

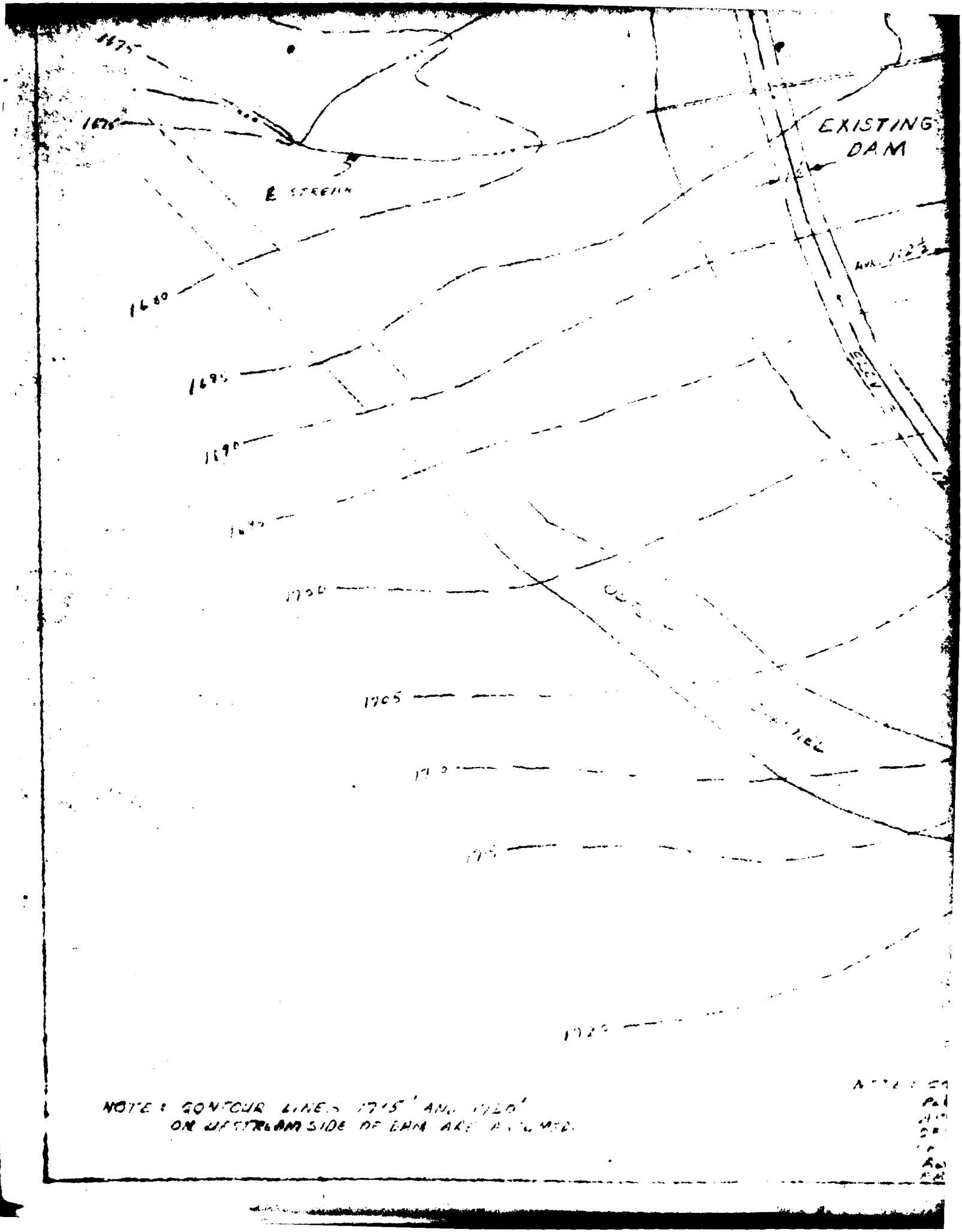
U.S.G.S. QUADRANGLE MAP - ROXBURY, N.Y.



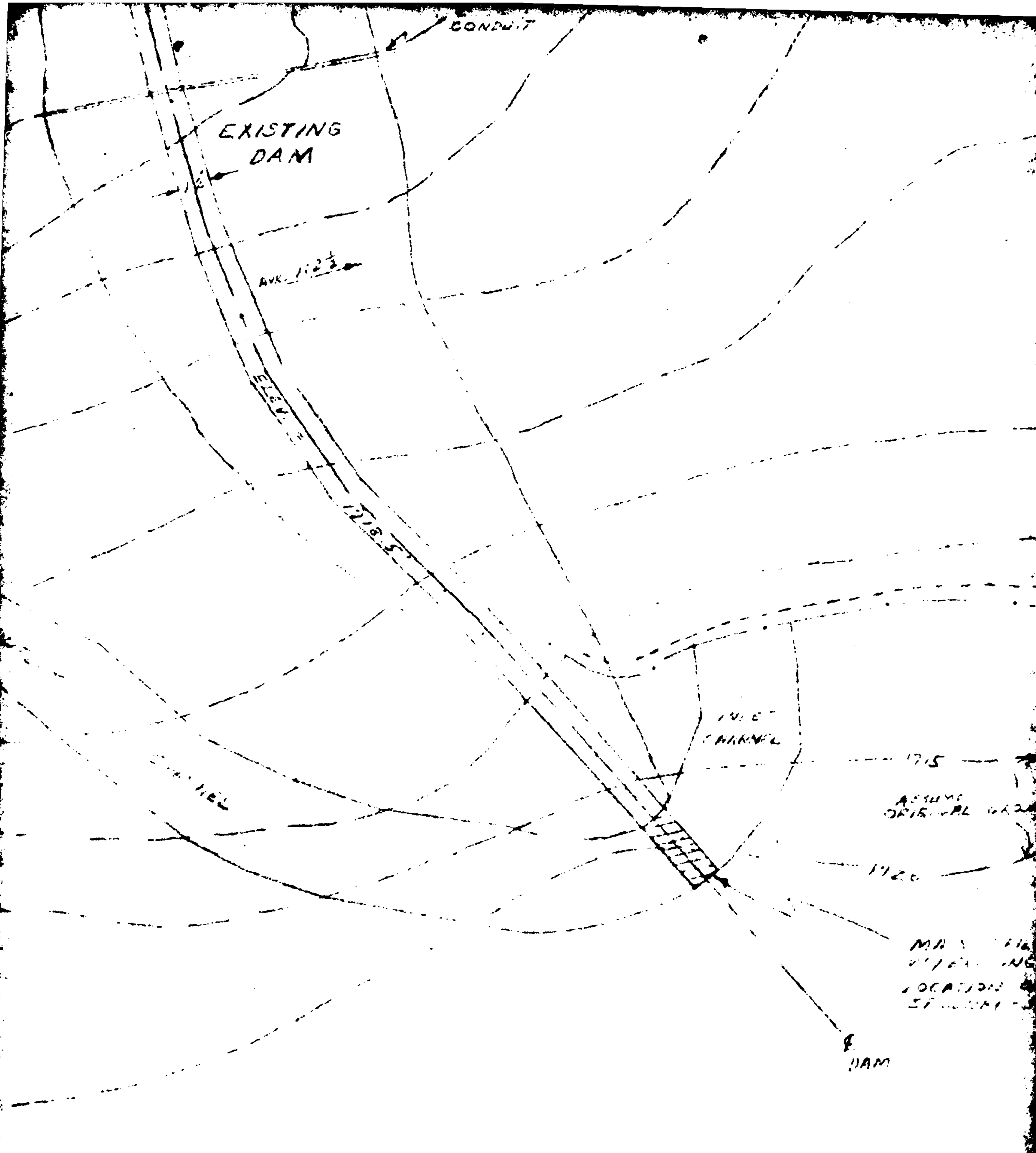
LOCATION MAP

SCALE: 1" = 2000'

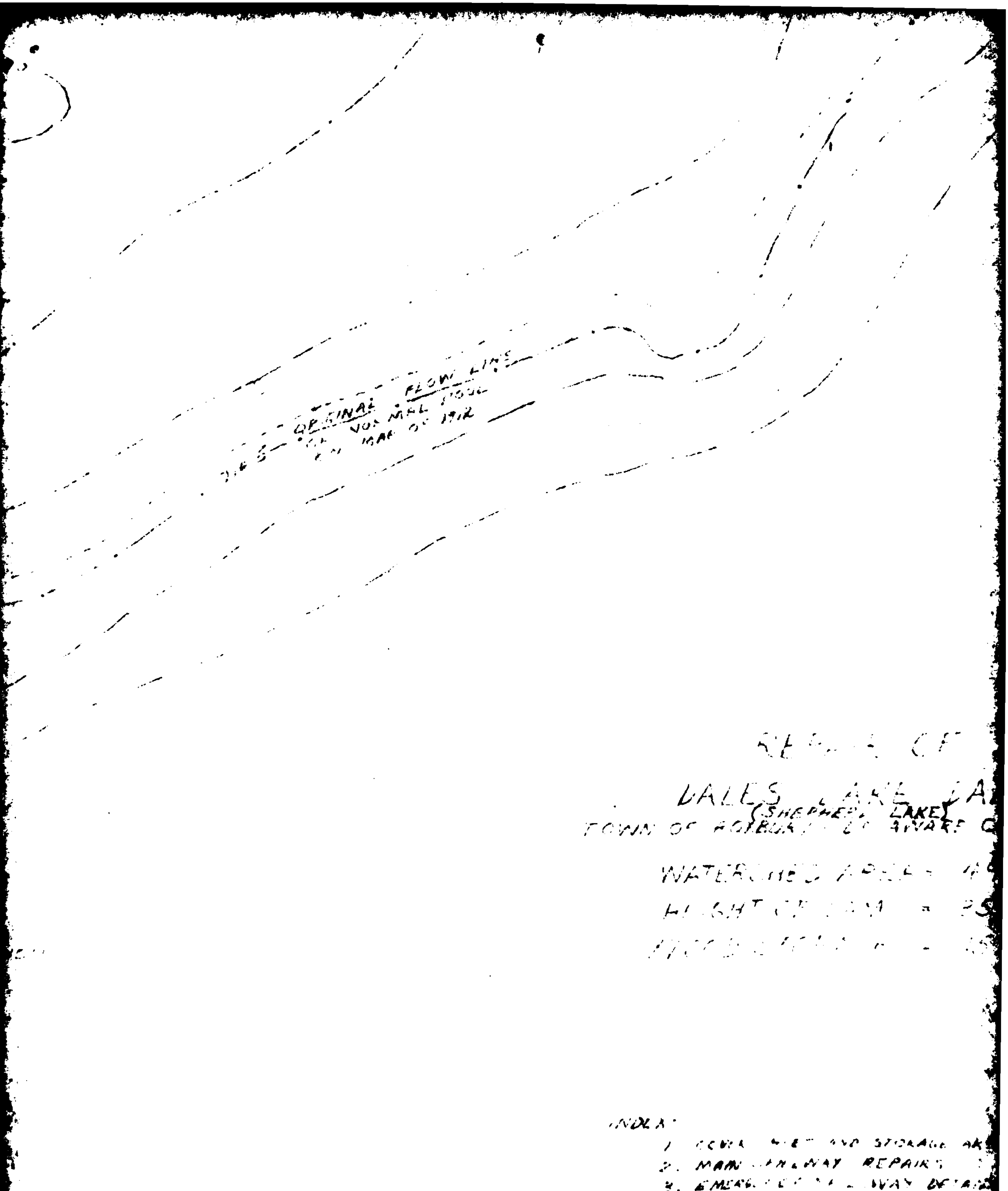
TRIANGLE MAP - ROXBURY, N.Y. - 1945



NOTE: CONTOUR LINES 1715' AND 1720'
ON UPSTREAM SIDE OF DAM ARE ASSUMED.



NOTE: CONTOUR MAP TAKEN [illegible] FORMER PLAN [illegible] IN 1912 - APPROVED ON OCTOBER 7, 1912 BY STATE OF N.Y. CONSERVATION COMMISSION, DIVISION OF INLAND WATERS - REFERENCE NO. 646. ALL EXISTING OUTLET [illegible] ARE TAKEN FROM SAME PLANS.


ORIGINAL FLOW LINE
NORMAL POOL
DALES LAKE DA
(SHEPHERD LAKE)
TOWN OF ROXBURY
WATERSHED AREA
HEIGHT OF DAM
INDEX
2. MAIN SPILLWAY REPAIRS
3. EMERG WAY DETAI

SHEET 1 OF 3

COVER SHEET AND STORAGE AREAS

FOR

DALES LAKE DAM

(SHEPHERD LAKE)

OWNERS: CHEMIEX CORPORATION

TOWN OF ROXBURY - DELAWARE COUNTY

NEW YORK STATE

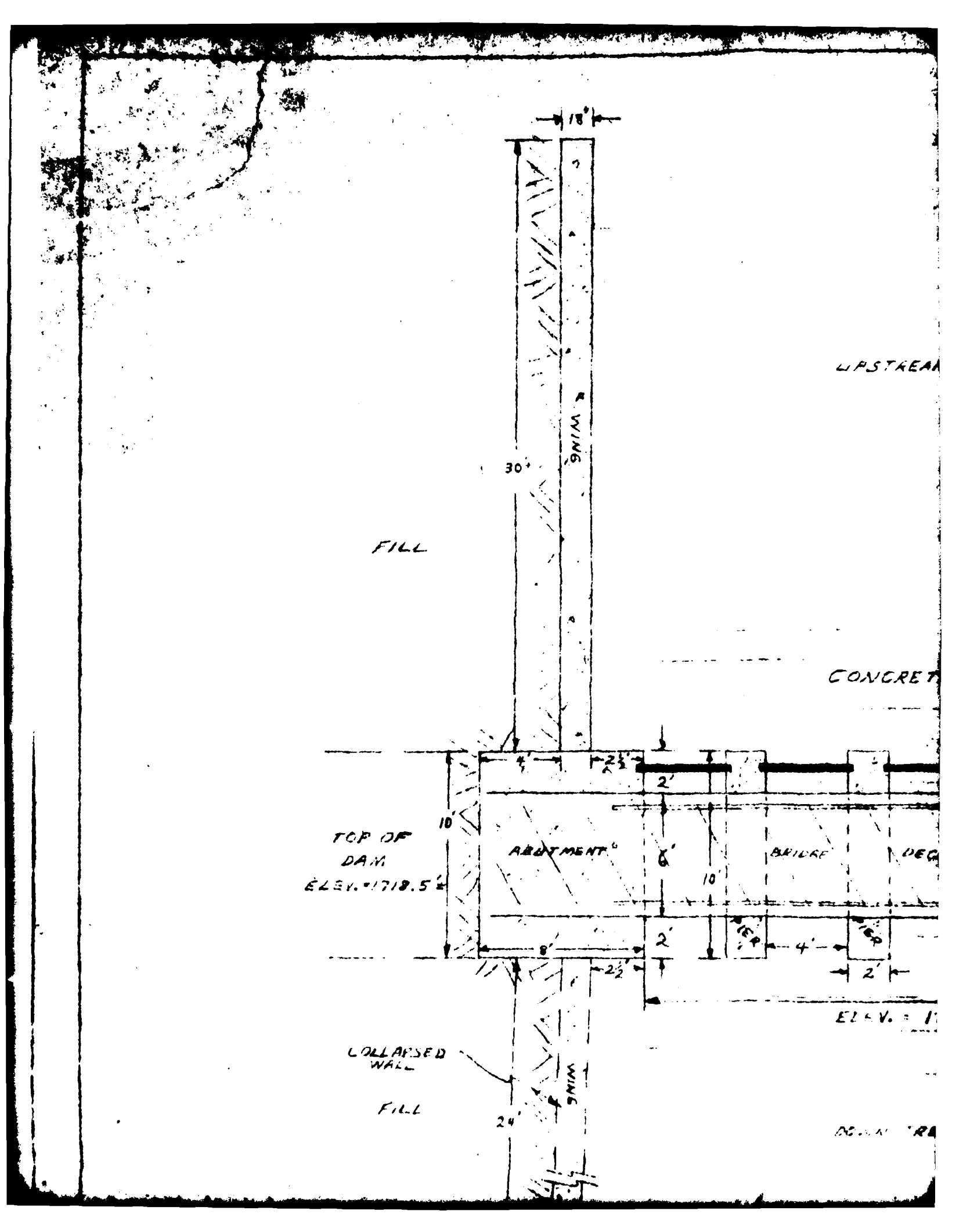
DESIGNED BY:

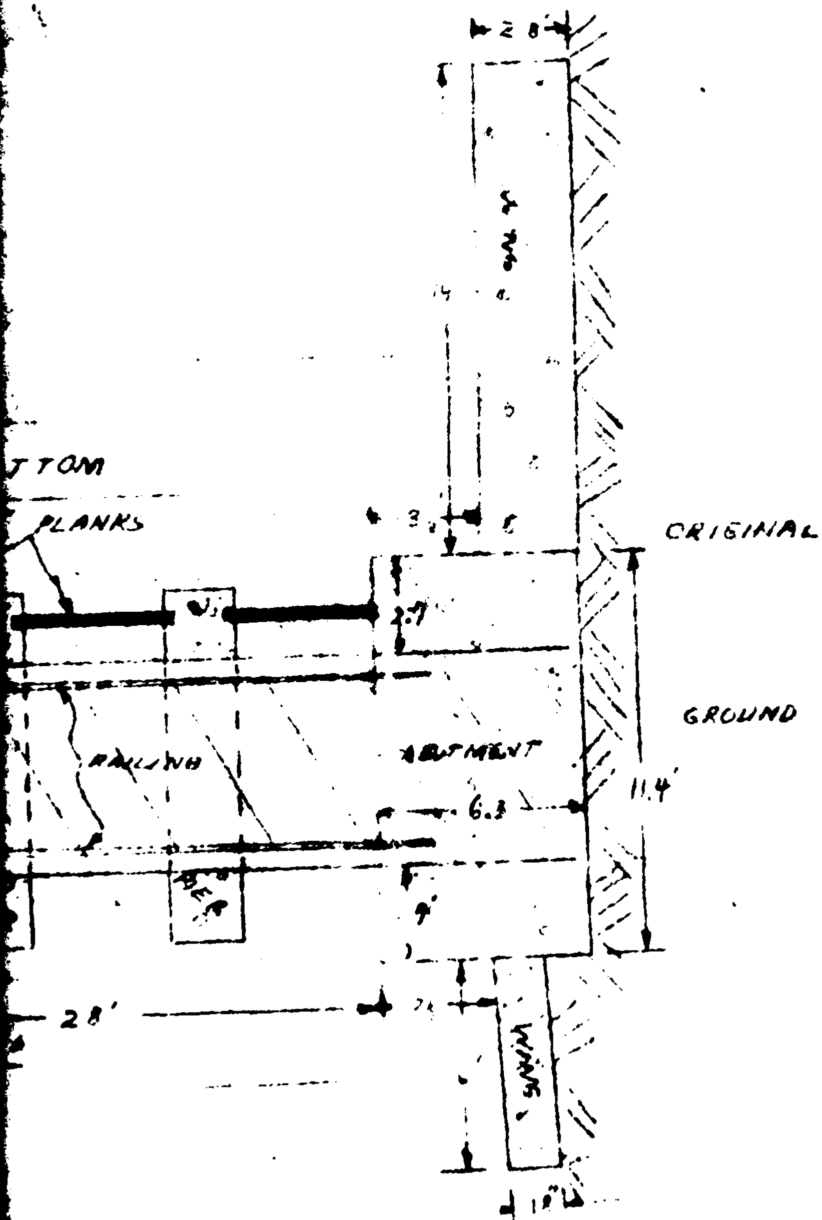
RICHARD F. BUCK AND ASSOCIATES

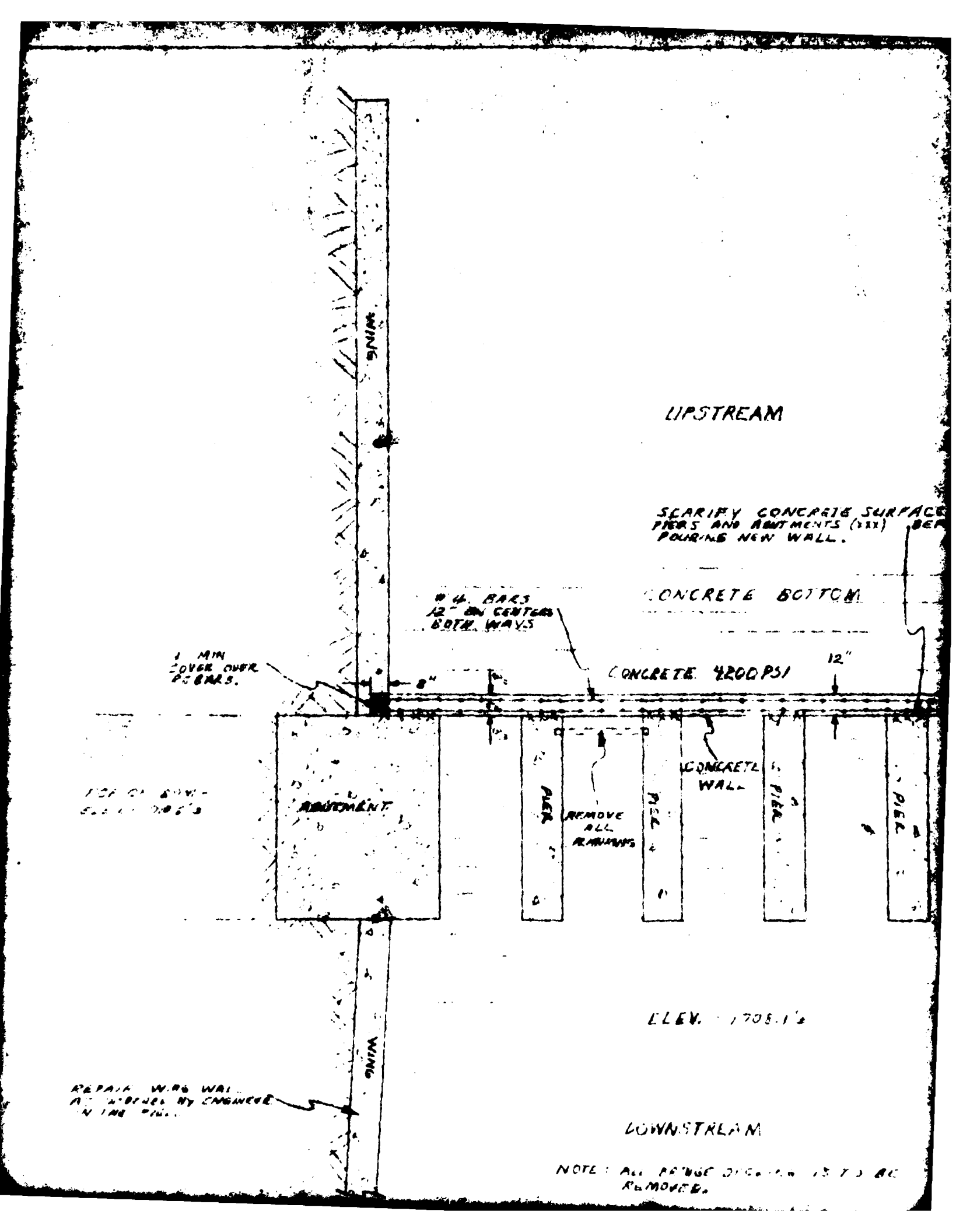
DEPOSIT, NEW YORK

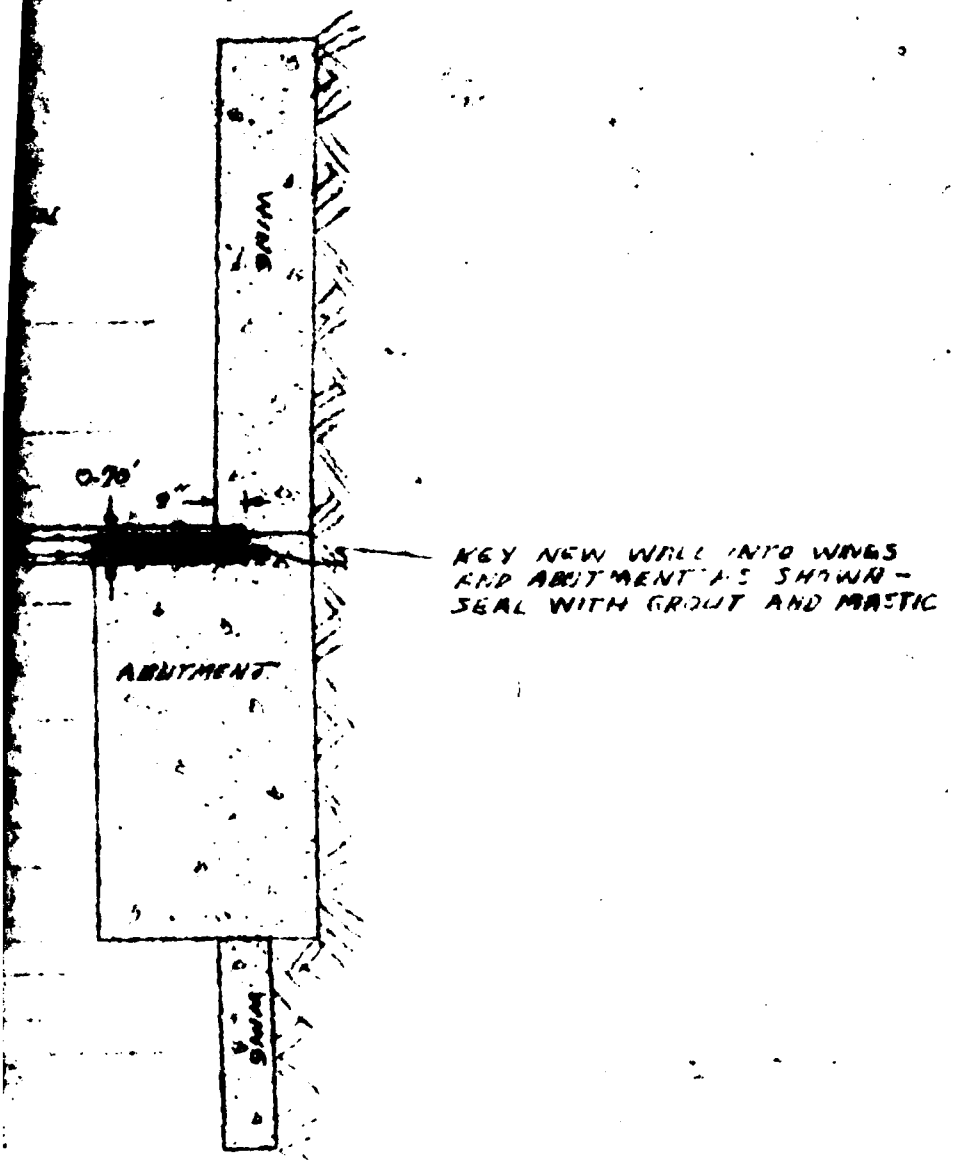
SCALE: 1" = 40'   JUNE 16, 19[illegible]

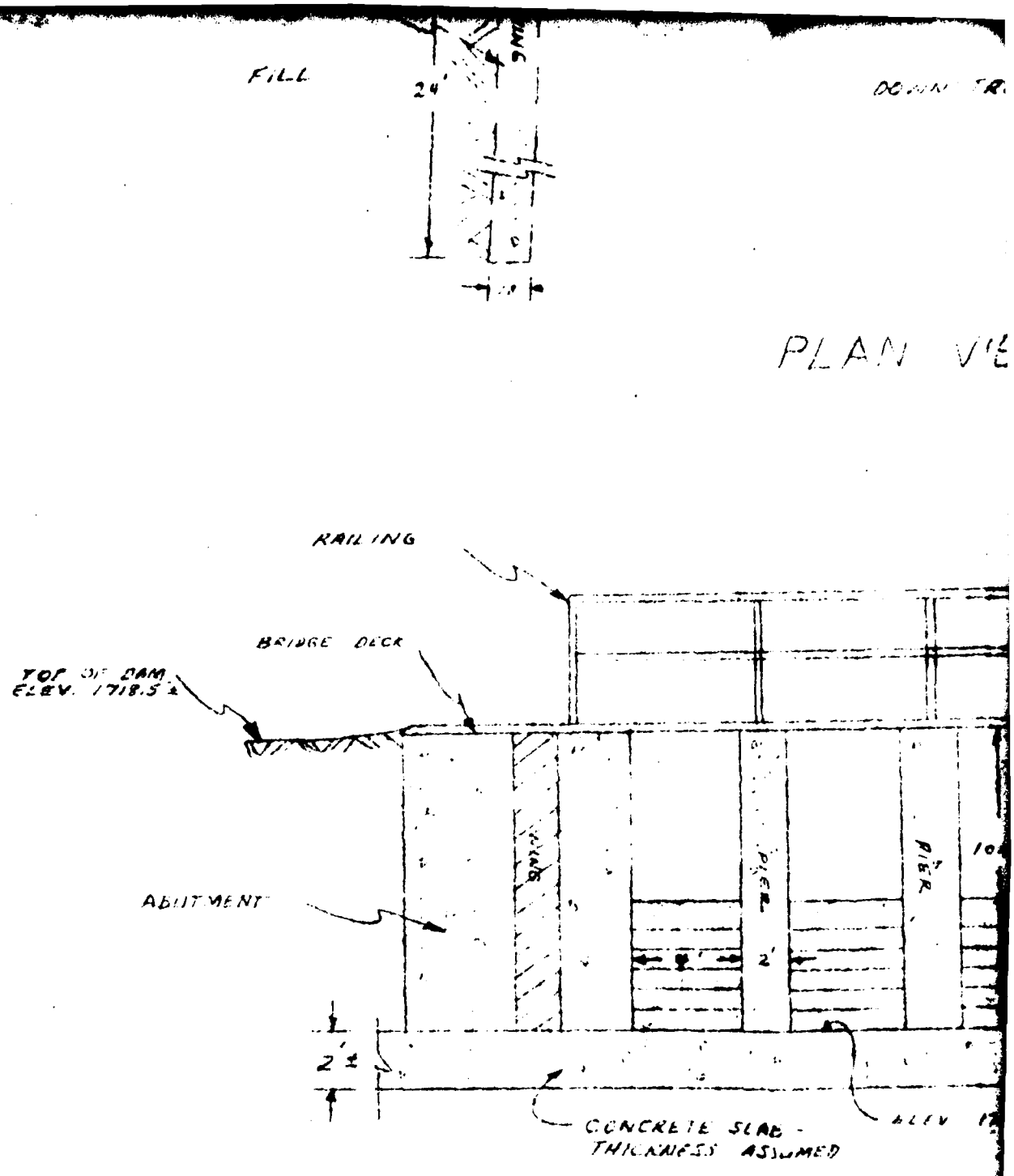
MAP NO. 769


18'
WING
30'
FILL
UPSTREAM
CONCRETE
4'
2½'
2'
10'
TOP OF
DAM
ELEV. = 1718.5'
ABUTMENT
6'
BRIDGE
DECK
10'
2'
8'
WEP
4'
WEP
2'
2½'
ELEV. = 1
COLLAPSED
WALL
WING
FILL
24'
DOWNSTREAM


2.8'
3.5
ORIGINAL
GROUND
PLANKS
2.7
ABUTMENT
6.3
11.4'
9'
28'

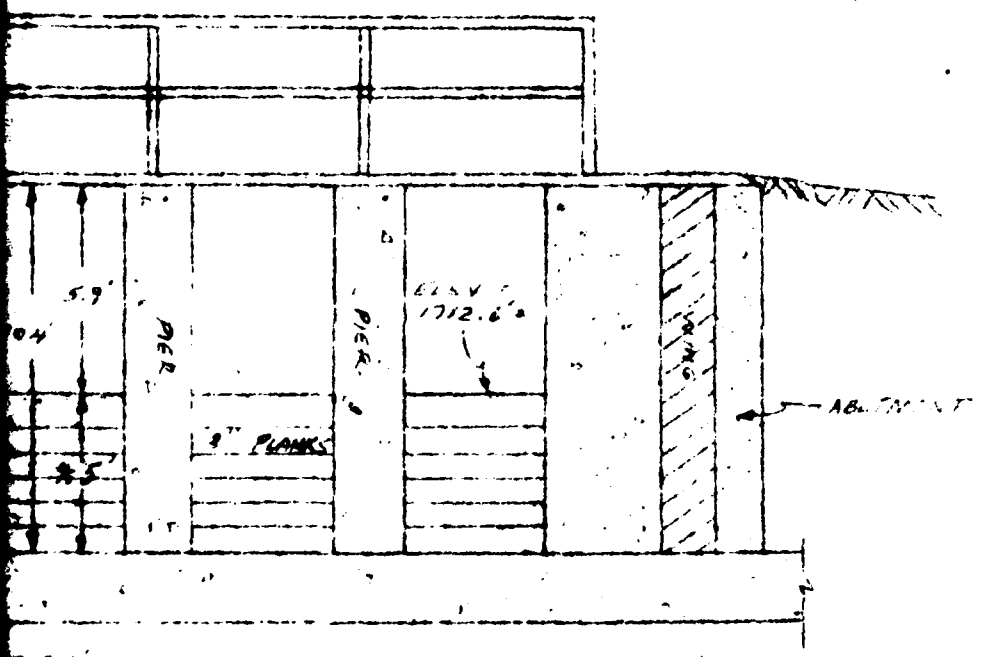

WING
UPSTREAM
SCARIFY CONCRETE SURFACE
PIERS AND ABUTMENTS (XXX)
POURING NEW WALL.
CONCRETE BOTTOM
#4 BARS
12" ON CENTERS
BOTH WAYS
1 MIN
COVER OVER
REBARS.
CONCRETE 4200 PSI
8"
12"
ABUTMENT
PIER
REMOVE
ALL
REINFORCING
CONCRETE
WALL
PIER
PIER
ELEV.
WING
REPAIR WING WALL
AS DIRECTED BY ENGINEER
IN THE FIELD.
DOWNSTREAM
NOTE: ALL DEBRIS SHALL BE
REMOVED.


WING
0.70'
9"
KEY NEW WALL INTO WINGS AND ABUTMENT AS SHOWN - SEAL WITH GROUT AND MASTIC
ABUTMENT
WING


FILL
24'
RAILING
BRIDGE DECK
TOP OF DAM
ELEV. 1718.5 ±
ABUTMENT
PIER
PIER
2'
2' ±
CONCRETE SLAB -
THICKNESS ASSUMED

TREAM

IEW



V

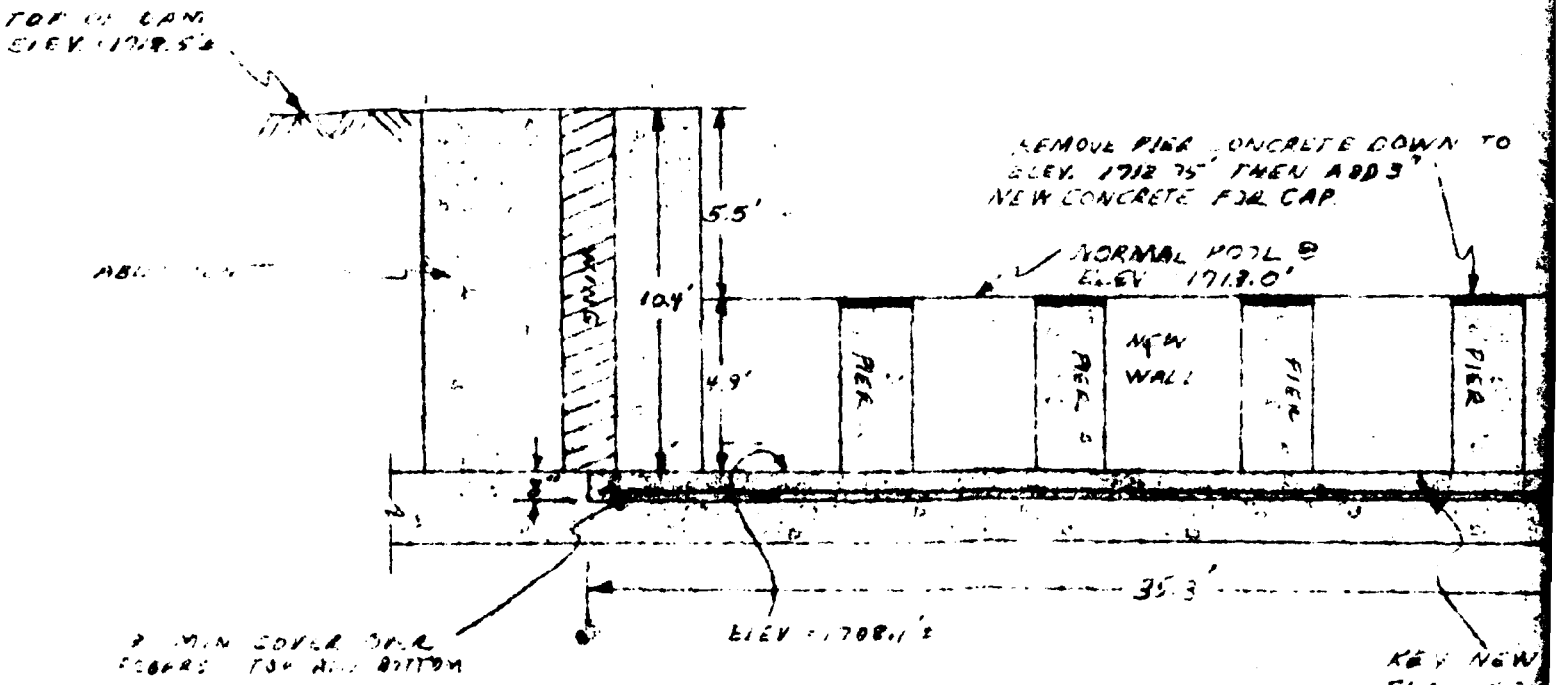
SPILLWAY

AS ORDERED BY ENGINEER
IN THE FIELD

DOWNSTREAM

NOTE: ALL BRIDGE DECKING IS TO BE REMOVED.

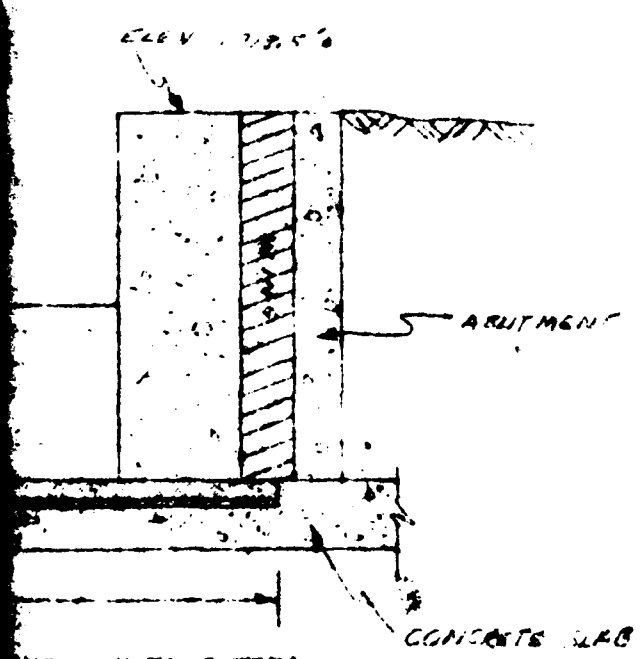
PLAN VIEW



ELEVATION

PROPOSED MAIN SPILLWAY

SCALE: 1" = 5'



HAL. INTO BOTTOM
OWN - SEAL WITH
ONSTR.

SHEET 2 OF 3

MAIN SPILLWAY
REPAIRS
FOR
DALES LAKE DAM
(SHEPHERD LAKE)

OWNER: CHEMTEX CORPORATION

TOWN OF ANDES - DELAWARE COUNTY
NEW YORK STATE

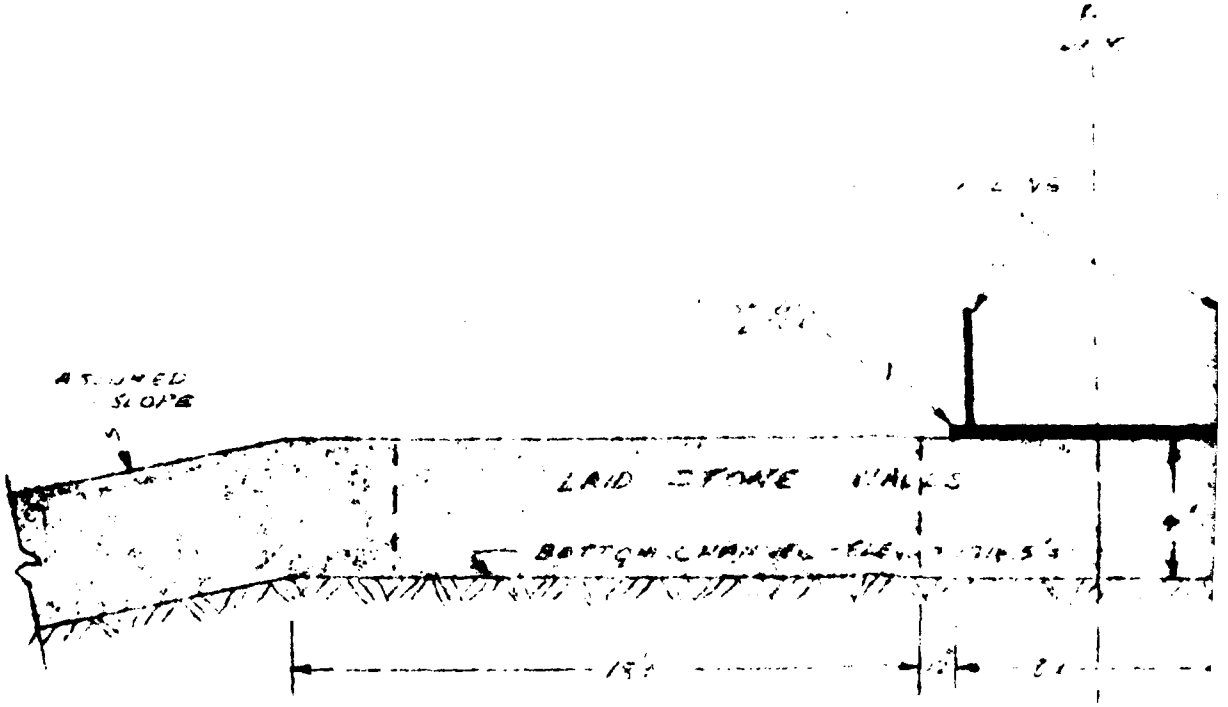
DESIGNED BY:

RICHARD P. BUCK AND ASSOCIATES
DEPOSIT, NEW YORK

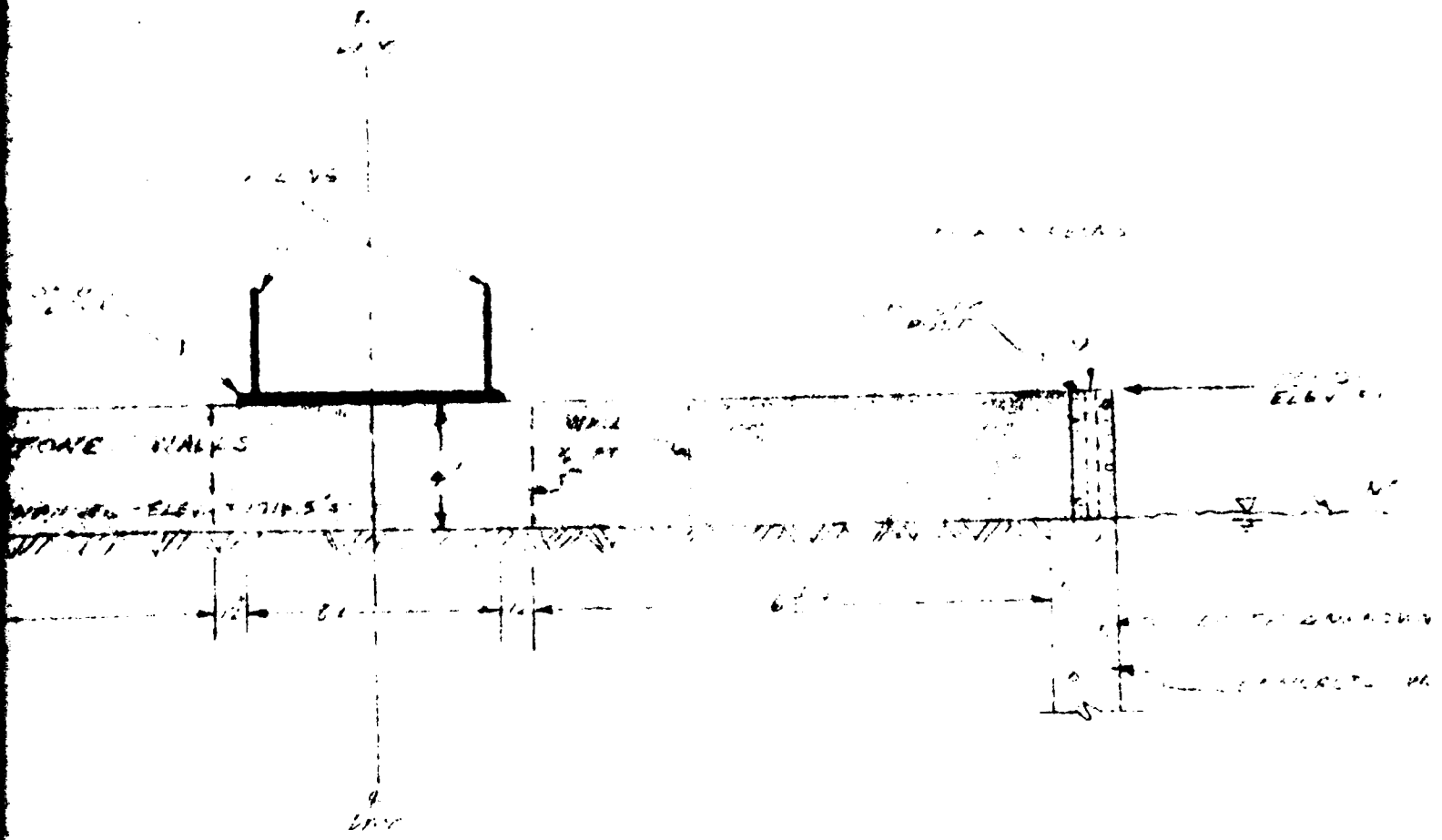
SCALE: AS SHOWN — APRIL 15, 1977

MAP NO. 7681

8

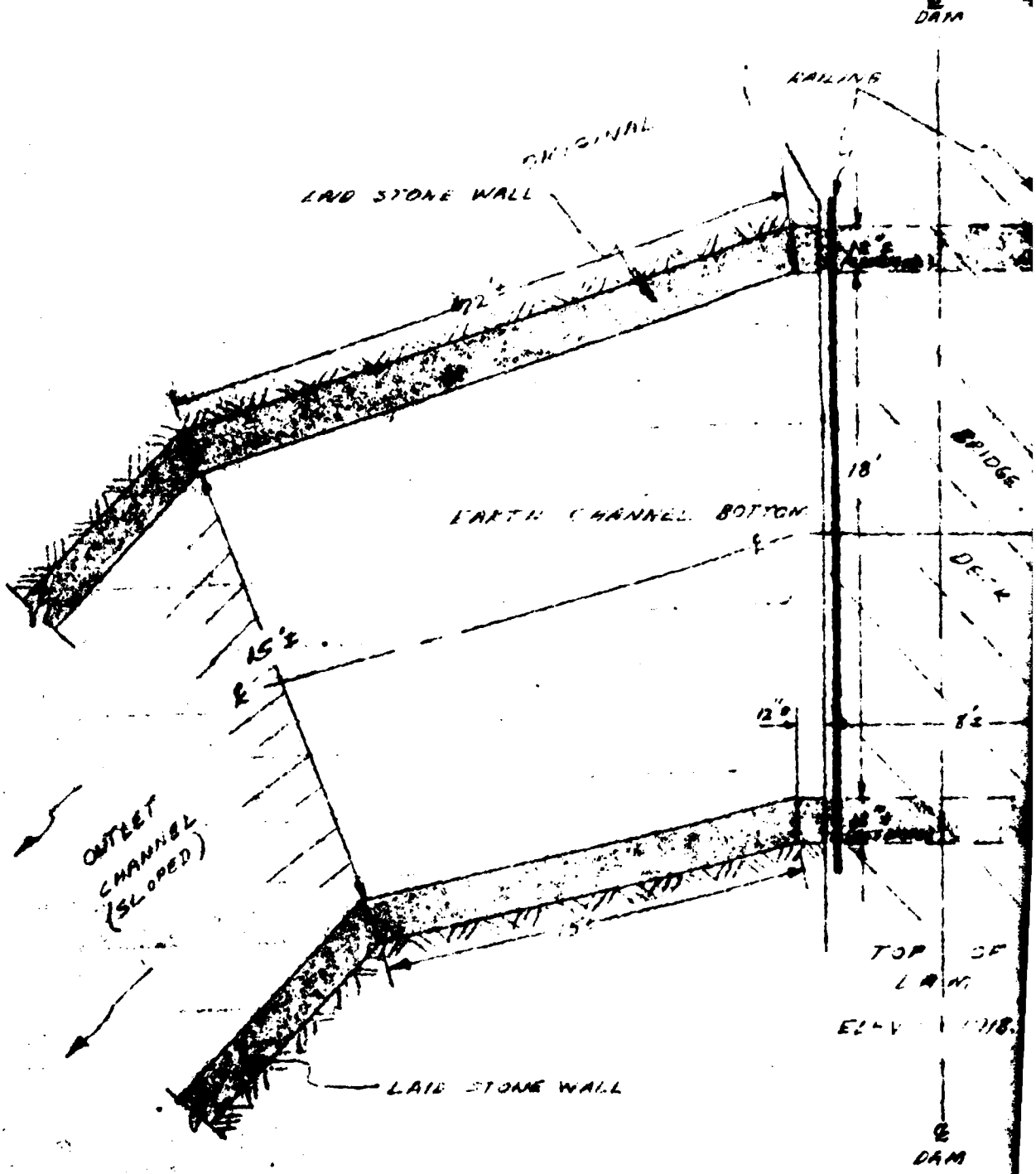


ELEVATION - E



ELEVATION - ℄ CHANNEL

AD-A087 588 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. ROXBURY DAM (INVENTORY NUMBER 788)--ETC(U)
MAY 80 G KOCH DACW51-79-C-0001
UNCLASSIFIED NL

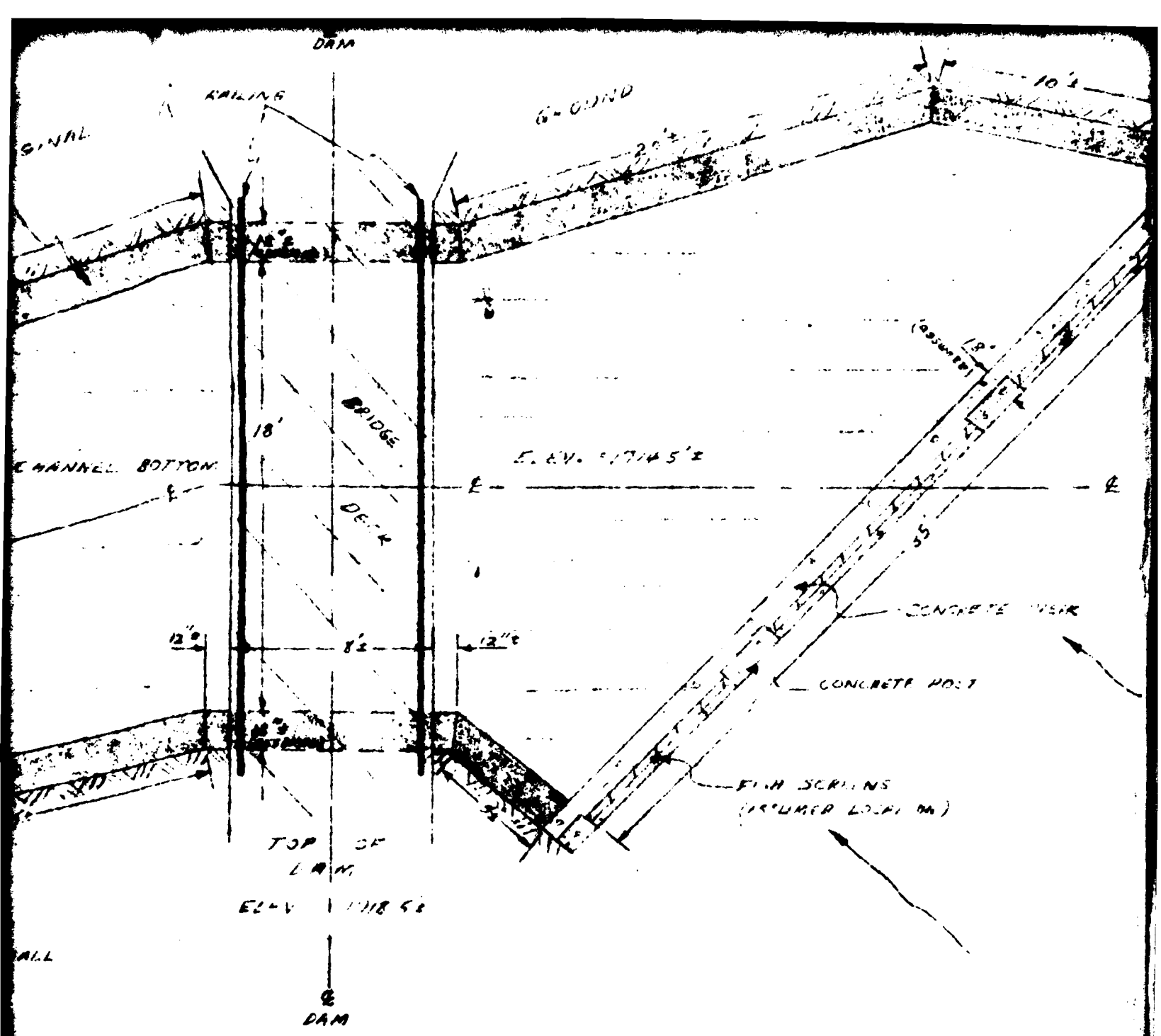


PLAN

EXISTING EMER

SCALE: 1" =

NOTE: EXISTING PLANS FOR SP
OF 1912 - SEE SHEET "

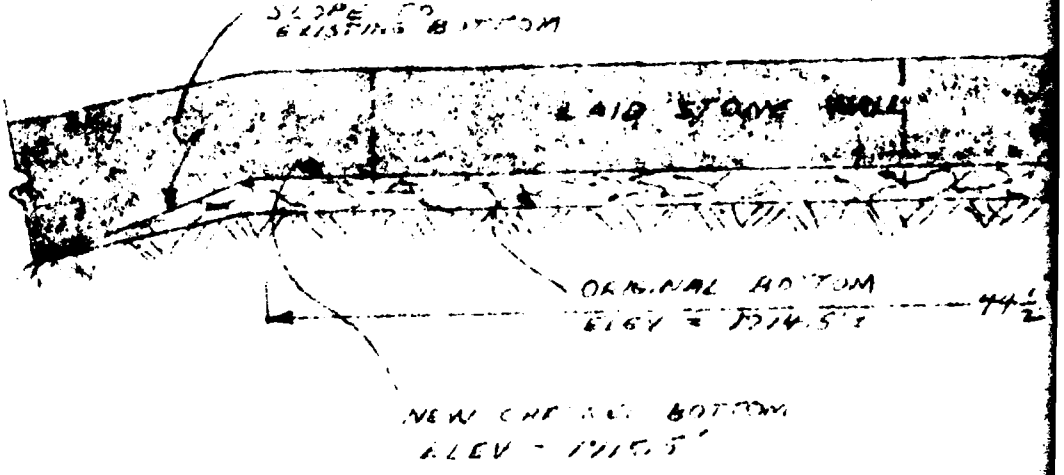


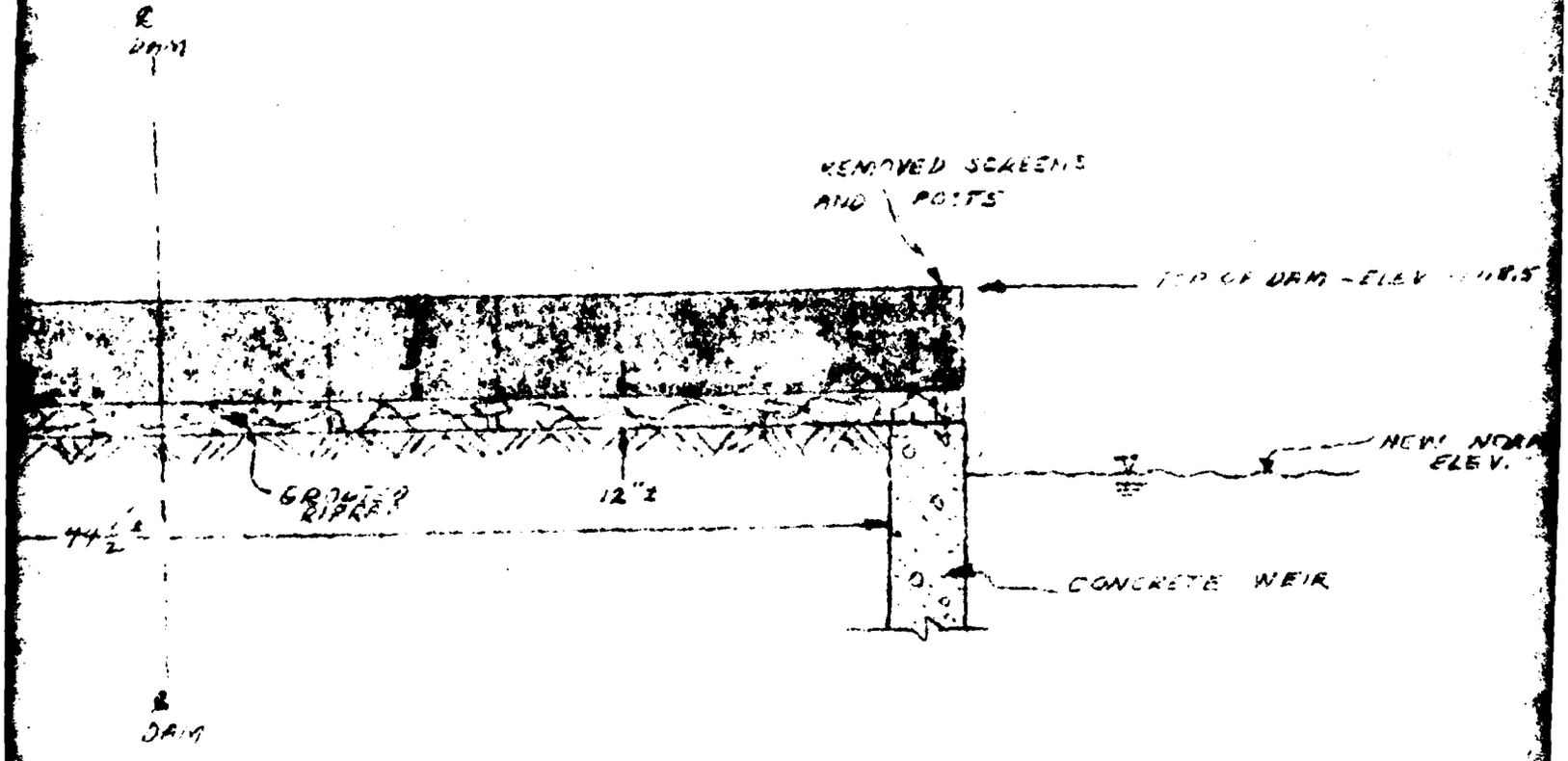
PLAN VIEW

EXISTING EMERGENCY SPILLWAY

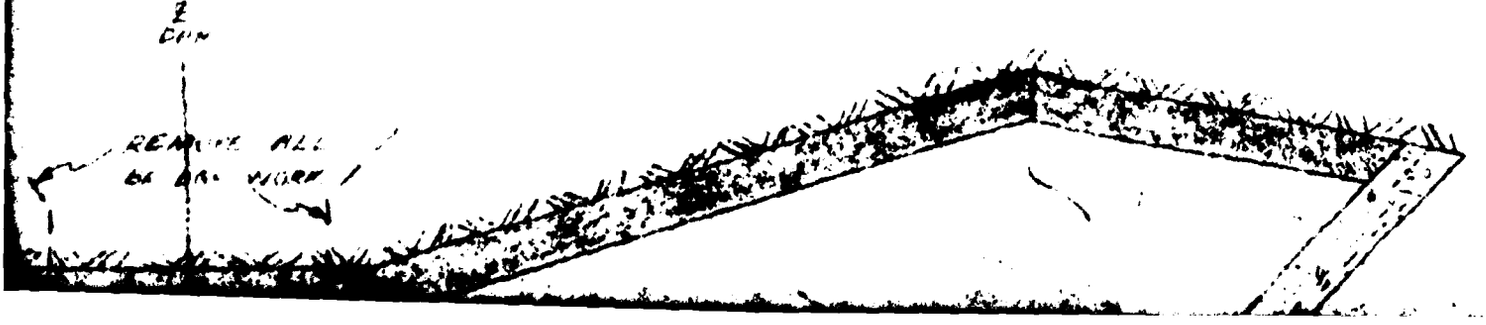
SCALE: 1" = 5'

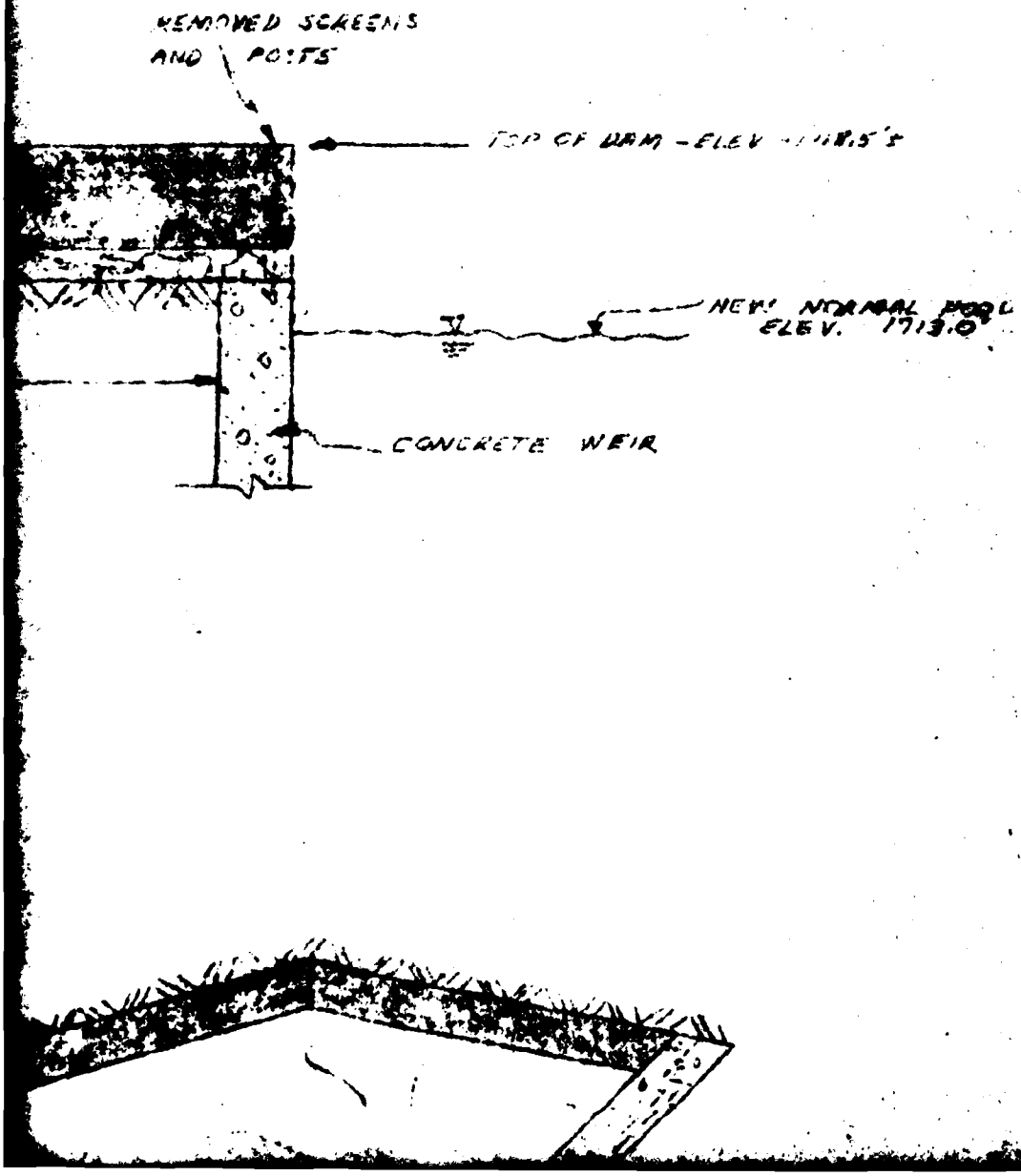
NOTE: EXISTING PLANS FOR SPILLWAY AS TAKEN FROM PLANS OF 1912 - SEE SHEET # 1 NOTE.

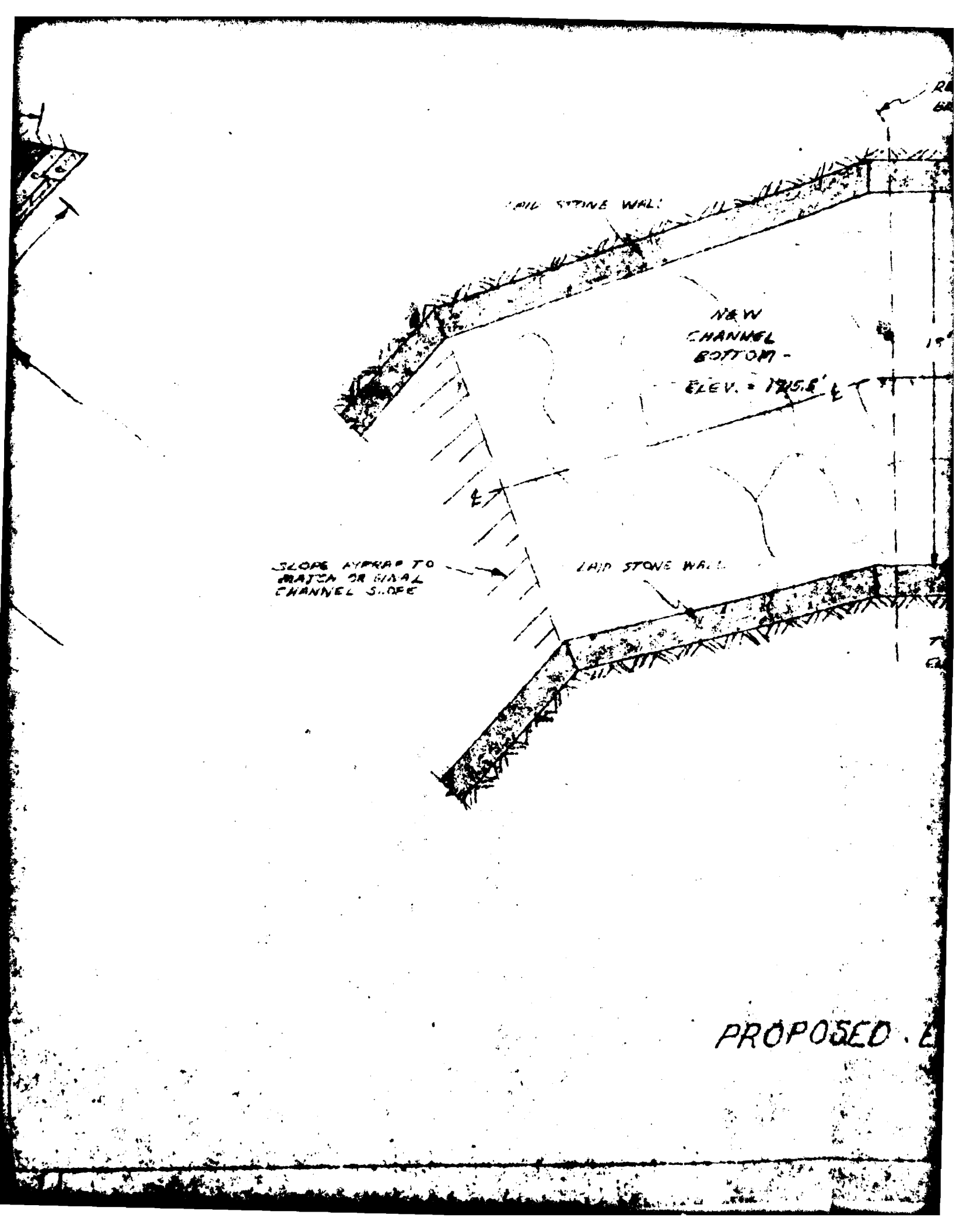

LAID STONE WALL
ORIGINAL BOTTOM

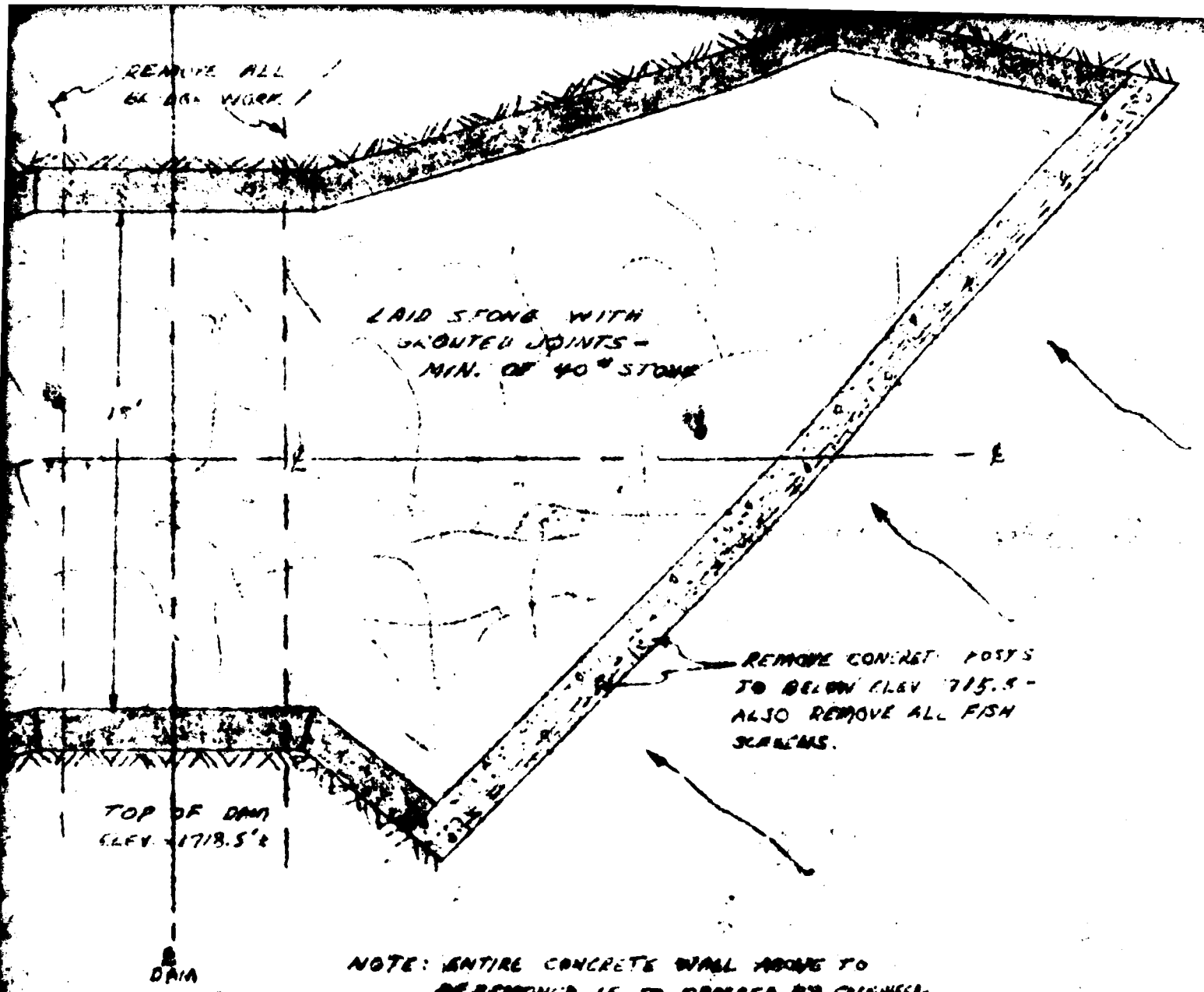


ELEVATION - ℄ CHANNEL




REMOVED SCREENS
AND POSTS
TOP OF DAM - ELEV. 1718.5'
NEW NORMAL POOL
ELEV. 1713.0
CONCRETE WEIR


LAID STONE WALL
NEW
CHANNEL
BOTTOM -
ELEV. = 1715.5'
SLOPE RIPRAP TO
MATCH ORIGINAL
CHANNEL SLOPE
LAID STONE WALL
PROPOSED



NOTE: ENTIRE CONCRETE WALL ABOVE TO BE REMOVED IF SO ORDERED BY ENGINEER UPON HIS FIELD INSPECTION. REPLACE WITH IMPERVIOUS FILL AND SLOPE TO POND BOTTOM @ 1:3.

NOTE: CHANNEL WALLS TO BE SEALED WITH GROUT IF SO ORDERED BY ENGINEER.

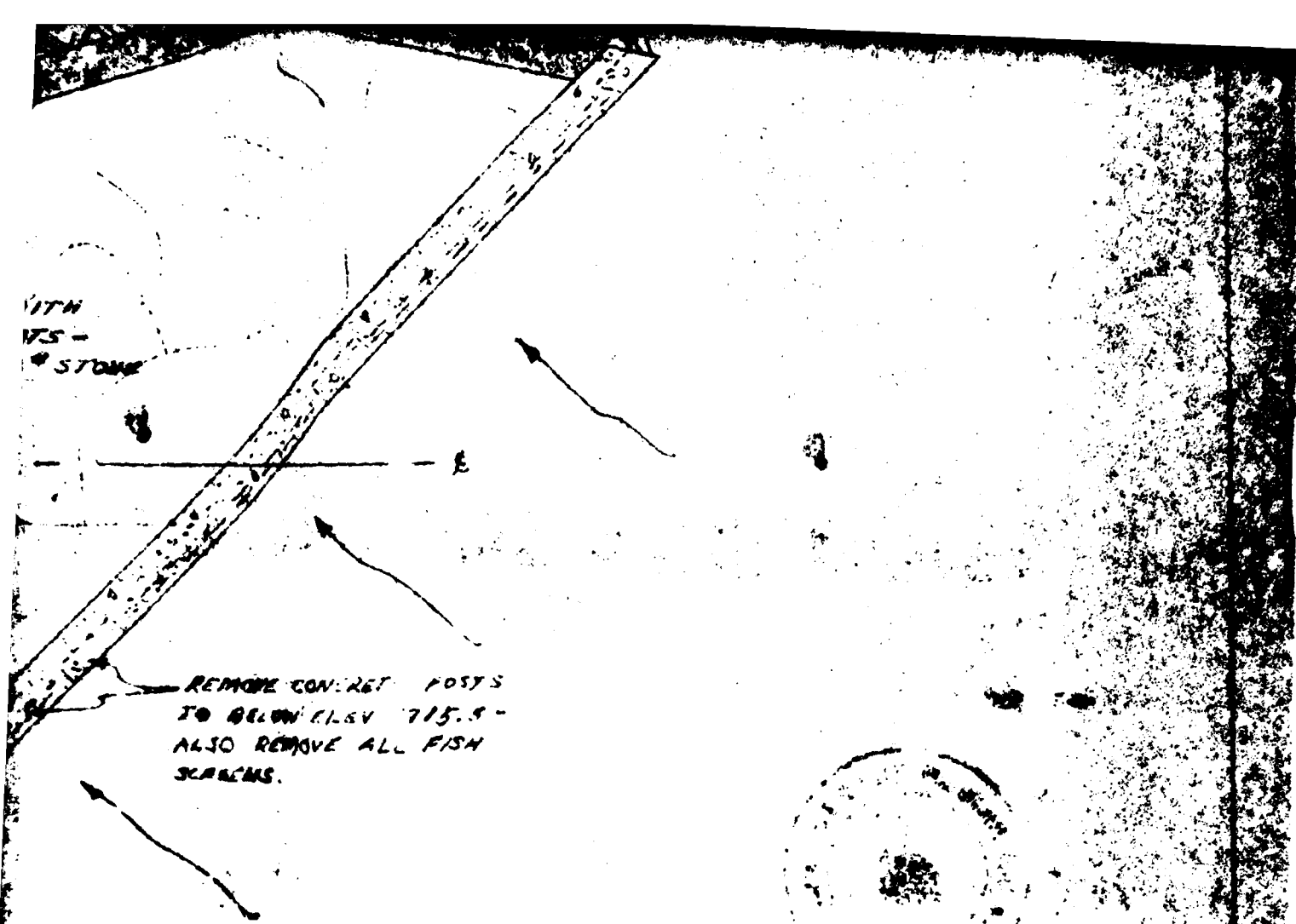
PLAN VIEW

D. EMERGENCY SPILLWAY

SCALE: 1" = 5'

EM

D



CRETE WALL ABOVE TO IF SO ORDERED BY ENGINEER INSPECTION. REPLACE WITH FILL AND SLOPE TO POND 1:3.

WALLS TO BE SEALED WITH SO ORDERED BY ENGINEER.

SHEET 3 OF 6

EMERGENCY SPILLWAY DETAILS

FOR

DALES LAKE DAM

(SNEDEKER LAKE)

OWNER: CHENANGO CONSERVATION

TOWN OF [illegible] - DELAWARE COUNTY

NEW YORK STATE

[illegible]

[illegible] NEW YORK

SCALE: AS SHOWN